ISM/Safety Improvement Project Plan

July 31, 2007

Revision No. 3

Office of Science
U.S. DEPARTMENT OF ENERGY

Brookhaven Science Associates
U.S. Department of Energy

BROOKHAVEN NATIONAL LABORATORY

Brookhaven National Laboratory
ISM/Safety Improvement Project Plan No. ATS 2944
July 31, 2007

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ISM/Safety Improvement Project Plan Change Log

Revision No.	Date	Reason
Draft	February. 15, 2006	Revitalization of the ISM Program
Draft	April 3, 2006	Operations Council Feedback and Suggestions on the appropriateness of corrective actions
0	May 16, 2006	Policy Council and DOE-BHSO briefed on the project plan. Project deliverable and action item dates entered into BNL 's Assessment Tracking System (ATS# 2944)
1	July 31, 2006	Added a new action item to establish requirements for personnel that perform assurance activities, and verification of the process. (Pg 28) Clarified several activities that spoke to updating senior management roles and responsibilities, and now require revisions and changes be forwarded to the Human Resource Management System contacts for incorporation in their R2A2s. Updated WBS 2.1.2 to include an action to evaluate the quality of job risk assessments based on their impact on worker planned work and institutional risk (Pg. 31). Updated WBS 2.1.5 to include an action to conduct workshops/training on revised work control processes (Pg. 34) Combined several corrective actions to revise the work planning and control subject area into one action. New action WBS 2.3 incorporates all required revisions/updates to SBMS documents (Pg. 36) Clarified WBS 3.1.3 deliverables. Organizations with specific SBMS deficiencies shall submit notices of intent to the SBMS office (Pg. 39). Updated WBS 4.1.5 to include Barrier Analysis and Five Whys causal analyses workshops in support of the renewed event/issues management process (Pg. 45) Updated WBS 4.1.6 to include the development and implementation of a Human Performance Strategy for the institution (result of the human-performance accident investigation from the arc-flash incident). (Pg. 46)

ISM/Safety Improvement Project Plan Change Log

Revision No.	Date	Reason
1	July 31, 2006	Updated WBS 5.1.2 to include improvement actions identified from benchmarking practices for MCC bucket insertion/removal with the bus energized. Electrical Safety Standard 1.5.0 will include requirements for performing this activity. (Pg. 51) Updated WBS 7.1.6 to include an action to update the Institutions Natural Phenomena Hazard Documentation (review of nuclear safety operations revealed that this document is required to reviewed and updated every 10 yrs) (Pg 67). Added a new improvement activity (WBS 7.3.4) employee concerns program evaluation. In an effort to benchmark best practices, Laboratory personnel reviewed the Savanna River ES&H evaluation and concluded that the ECP program at BNL should be reviewed for compliance with DOE O442.1A. (Pg. 73) Added a new improvement activity (WBS 7.3.5) Executive Management Training Program for Laboratory Operations and Support Managers. (Pg. 74) Added a new improvement activity (WBS 7.3.6), evaluate electronic delivery of experimental safety forms. (Pg. 74) Added a new improvement activity (WBS 7.3.7), an evaluation of the effectiveness of off-site ISM practices. (Pg. 74) Added a new improvement activity (WBS 7.3.8), review of the institutions safety committees reporting structure. (Pg. 75) Added a new improvement activity (WBS 7.3.9) to perform a follow-up review on feedback and improvement, and work planning and control elements of this plan. (Pg. 75) Added new appendix that summarizes the project assessment activities. (Pg 81)

ISM/Safety Improvement Project Plan Change Log

Revision No.	Date	Reason
2	January 29, 2007	Added a new activity to WBS 2.3, Revise WP&C Management System/Subject Area to include the review and assurance that functional connections are made with related management system processes. (Pg. 38) Clarified activity WBS 3.1.1, to evaluate the feasibility of combining ISM management systems. The activity previously required the combination of several management systems without evaluating the impact. (Pg. 40) Clarified WBS 3.2.1, the requirements management process implementation to align with the Quality Management Office project plan. (Pg. 43) Added a new activity under WBS 3.2.2, SBMS Completion Project. The SBMS Office Will update revision histories and review dates for documents reviewed/updated to support this activity. (Pg. 43) Updated WBS 5.0, Corrective Actions – Collider Accelerator Department Arc Flash Type B Incident. DOE-BHSO approved the BNL corrective action plan; action items were incorporated into this project plan under new section 5.3, BNL Arc Flash Corrective Action Plan Activities approved by DOE. Integrated ongoing WBS activities that duplicate DOE approved corrective action plan activities. (Pp 52 – 66). Updated WBS 7.1.6, Nuclear Safety Authorization/Readiness to include opportunities for improvement identified from the assessment of documented safety bases and pertinent exclusions/exemptions for special form sources. (Pg. 78) Clarified WBS 7.2 New Program Implementation-10CFR850 & 10CFR851. Changes were made to align worker safety and health activities with the Safety and Health Services Division 10 CFR 851 project plan activities. (Pg. 80)
3	July 15, 2007	Updated the project plan and schedule to include progress/status as of July 15, 2007. Updated WBS 2.2.2, Revitalize the Training Program for WCMs/WCCs. The target completion date was extended to the end of the calendar year (Pg. 38) Revised WBS 7.1.6, Nuclear Safety Authorization / Readiness to include Nuclear Safety Program, Improvement Project activities (Pg. 79)

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Glossary of Document Acronyms and Abbreviations

ATS	Assessment Tracking System
BHSO	Brookhaven Site Office
BNL	Brookhaven National Laboratory
BSA	Brookhaven Science Associates
DART	Days Away, Restricted, or Transferred
DDO	Deputy Director for Operations
DOE	Department of Energy
EPA	Environmental Protection Agency
EMS	Environmental Management System
ES&H	Environment Safety & Health
ESH&Q	Environment, Safety, Health & Quality
FRA	Facility Risk Analysis
FUA	Facility Use Agreement
FY	Fiscal Year
HQ	DOE Headquarters
ISO	International Organization for Standardization
ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
JON	Judgments of Need
JRA	Job Risk Analysis
OHSAS	Occupational Health & Safety Assessment Series
QA	Quality Assurance
QAP	Quality Assurance Program
QMO	Quality Management Office
QMS	Quality Management System
SBMS	Standards-Based Management System
S&HS	Safety and Health Services
SME	Subject Matter Expert
TRC	Total Recordable Case
WBS	Work Breakdown Structure
WCC	Work Control Coordinator
WCM	Work Control Manager
WP&C	Work Planning and Control

I Introduction

Brookhaven Science Associates (BSA) operates Brookhaven National Laboratory (BNL) under contract to the U.S. Department of Energy. BNL a multi-program national laboratory established in 1947, is located about 60 miles east of New York City, on a 5300 acre site at the east end of Long Island. The Laboratory has about 2600 employees and an annual budget of over $460 million. BNL's primary mission is to design, construct, operate, and develop large, world-class research facilities for the international scientific community. BNL's research programs include programs that cover nuclear and high-energy physics, basic energy sciences, life sciences, energy and environmental research, and applied and national security research. More than 3500 scientists visit BNL yearly to conduct their research. The Lab also hosts over 20,000 student and faculty visitors per year, as part of its science education mission.

BNL's vision is that of simultaneous excellence in science, operations, and community and stakeholder relations. Excellence in operations includes, as its highest priority, demonstrating world-class performance in worker safety and health and environmental stewardship. Laboratory senior management is committed to the premise that all injuries are preventable, and that BNL will strive continuously to be an injury-free workplace. Similarly, management places a great importance upon being a good steward of the environmental assets on the site, as well as in the adjacent ecosystem. These commitments will be communicated and managed through the Strategic Focus Area (SFA) framework discussed later in this document.

When BSA took over the operation of BNL in 1998, both worker safety and health and environmental stewardship needed improvement. They launched an aggressive campaign to implement DOE's Integrated Safety Management (ISM) to drive a rapid change in safety performance. In parallel, environmental programs were improved as part of an initiative to become the first DOE Laboratory to achieve registration to the International Standards Organization (ISO) 14001 Environmental Management System standard. This goal was reached in 2000, and BNL's Environmental Management Program continues along its path of improvement, most recently achieving Environmental Protection Agency (EPA) "Performance Track" recognition.

The Laboratory's initial implementation of ISM produced impressive results. Compared to FY 1998, BNL's Days, Away, Restricted or Transferred (DART) rate in fiscal year (FY) 2005 decreased by a factor of 4, a rate that was 50% below FY 2004, and a factor of 3 decrease in Total Recordable Case (TRC) rate as compared to FY 1998, which continues to fall. We are working hard to drive injuries down, with the goal of reaching zero within the next five years. While the Laboratory continues to strive to meet the DART goals of the DOE office of Science we have not yet met them and must do better. Also, we still experience near misses that point to weaknesses in the ISM program. Our senior leadership team, using feedback from BNL's Integrated Assessment Program (IAP) and input from DOE, continually introduces new programs and vigorously pursues corrective actions, all with the goal of accelerating progress toward our vision of zero-injury. An example of this commitment is our pursuit of Occupational Health and Safety Assessment Series (OHSAS) 18001 registration (about 2/3 of Laboratory organizations have done so to date).

In October 2005, Laboratory management commissioned a comprehensive review/gap analysis of our implementation of ISM. This analysis conducted over two-weeks by a peer-review team, identified several shortcomings and omissions in the ISM Program. This ISM/Safety Improvement Plan outlines the Laboratory's corrective actions and initiatives developed in response to this review, and other activities needed to improve overall safety performance.

II BNL Integrated Safety Management Program

The DOE made ISM a requirement of the contract between DOE and Brookhaven Science Associates (BSA) for the management and operation of Brookhaven National Laboratory. DOE Brookhaven Site Office (BHSO) oversees BNL's ISM Program through their regular interactions with BSA/BNL senior management, their facility representative program, ongoing surveillance, and targeted assessments. BHSO has also included Environment, Safety and Health (ES&H) performance objectives in the BSA contract. BHSO and BSA operate within a partnership agreement that includes freely sharing ISM related information to drive continuous improvement.

II.a Roles and Responsibilities for ISM

The Board of Directors of BSA holds the Laboratory Director accountable for achieving excellence in ES&H. Through its Corporate Assurance process, the Board charged the BSA's Operations Risk Committee with reviewing this ISM/Safety Improvement Plan, monitoring its establishment, and ensuring that the BNL ISM Program meets contract expectations.

The Laboratory Director is responsible for the Laboratory's ISM Program and is the final approval authority for this Plan. He charged the Deputy Director for Operations with managing the implementation of this ISM/Safety Improvement Plan to ensure the completion and verification of the effectiveness of the actions needed to close the gaps in BNL's ISM program. The Deputy Director has assigned the ISM/Safety Improvement Project Manager the task of defining and "projectizing" the work scope, identifying and aligning the needed resources, managing the execution of activities by the project team, and regularly tracking and reporting progress to senior management.

The Laboratory's Policy Council, which reports directly to the Laboratory Director, meets twice monthly to consider matters related to BNL's performance, priorities, resource allocation, policy formulation or revision, and planning. They formally review performance quarterly, across the spectrum, and make recommendations for action to the Laboratory Director. Specific events are reviewed and discussed on an ad hoc basis as they occur. The Policy Council has reviewed and endorsed this Plan and its members have committed to providing the line organization resources necessary to assure its implementation.

II.b ISM Program Description

BNL's ISM Program utilizes several of the "Management Systems" within the Standards-Based Management System (SBMS). The elements are tied together through the ISM Program Description which can be reached via the following link https://sbms.bnl.gov/SBMSearch/ProgDesc/ISM/ISM_PD.cfm?ProgdescID=4.

To improve the clarity, delivery and performance of the ISM Program, several ISM-related management systems will be merged into a single Integrated Environment, Safety and Health Management System.

II.c Laboratory ES&H Goals

BNL embarked upon transitioning to a strategic focus based on a framework of simultaneous excellence. At a Director's Planning Retreat in January 2006, BNL's senior management identified six "strategic focus areas" (SFA). They are not prioritized:

1. Advancing the Frontiers of Science
2. Attracting and Retaining Top Talent
3. Modernizing the Lab's Infrastructure
4. Improving Quality and Reducing the Cost of Business
5. Achieving Excellence in Environment, Safety, Security and Health (ESS&H)
6. Fostering Excellent Stakeholder Relationships

Achieving excellence in ESS&H (SFA 5) clearly has the dominant role in ISM. Attracting and Retaining Top Talent, Modernizing the Lab's Infrastructure, and Improving the Quality and Reducing the Cost of Business (SFAs 2, 3, and 4 respectively) have significant contributing roles in meeting the objectives of ISM core functions and guiding principles.

A senior management champion was appointed for each SFA and teams were gathered to establish specific goals and initiatives. The teams will complete their work by the end of the summer of 2006. Then, more specific goals will be instituted for each area for FY 2007.

The FY 2006 goal for worker safety and health is to surpass the Total Recordable Case (TRC) and DART goals set by the DOE Office of Science.

This ISM/Safety Improvement Plan fully supports this goal by broadening and strengthening BNL's ISM Program. The project's goals are to competently finish each project activity, within allocated cost (or contributed resource commitment) and schedule, and to verify the effectiveness of each of the completed actions (or take further corrective action).

Other frameworks for establishing institutional strategy were used at BNL in the past (i.e. "Simultaneous Excellence" and Critical Outcomes".) However, neither one was fully implemented through systematic prioritization, business planning, and on-going performance monitoring. The transition to strategic focus being followed through this plan will assure flow-down and translation of institutional strategy into routine business planning and on-going management processes (e.g. assurance).

III Project Description/Project Plan Development Process

BNL's IAP covers line self-assessment, management system steward assessments, incident critiques, independent assessments (Independent Audit/Independent Oversight, BSA Corporate Oversight) and external assessments (BHSO, DOE Headquarter (HQ), and Inspector General (IG) with each mode typically using a mix of performance measurement and data analysis, in-person reviews with managers, supervisors and workers, and survey products.

Over the last three years, several significant reviews focused specifically on the Laboratory's ISM Program:

- FY 2004 Multidisciplinary Task Force Review (Institutional Level Self-Assessment)
- FY 2004 ISMS Assessment (External - DOE Chicago Support Office)
- FY 2005 ISM Focused Management Review (External – DOE Chicago Support Office)
- FY 2006 Evaluation of ISM at BNL (Institutional Level Self-Assessment)

Note: The reports from these reviews can be accessed at http://www.bnl.gov/qmo/ISM.asp

Based on the information presented to senior management from these reviews, as well as other IAP input, the Laboratory Director commissioned a comprehensive review/gap analysis of BNL's ISM program in the fall of 2005. It identified several shortcomings and omissions, most importantly a programmatic deficiency in feedback and improvement at the Institution level. Furthermore, the review team recommended several organization-specific corrective actions, many of which are being adapted for improvement as part of the corrective actions outlined in this plan.

The Laboratory took a parallel approach to managing these results. Since many of the findings and recommendations spoke to specific issues, corrective actions were developed and launched to address them. However, the scope of the findings, the institutional level feedback and improvement programmatic deficiency and repeat findings, remain a significant concern to Laboratory management, and an indication that there were underlying issues needing to be resolved.

With the assistance of BSA corporate and consultant resources, the Laboratory looked beyond the individual findings of each of the reports to identify common problem areas, and then used causal analysis techniques to probe their direct and root causes. In all, five problem areas were identified as follows:

1. The Laboratory has not established effective institutional-level self assessment, corrective action management and feedback and improvement processes.
2. The work planning and control process is not achieving the Laboratory's goals and objectives.
3. Some Laboratory-wide and internal controlled procedures are not current and in some cases do not offer adequate or complete instructions.
4. Communication and involvement processes do not always result in adequate understanding of, and response to, Environment, Safety and Health (ESH&Q) and operational issues and decisions.

5. The corrective action/issues management process is not achieving the Laboratory's goals and objectives.

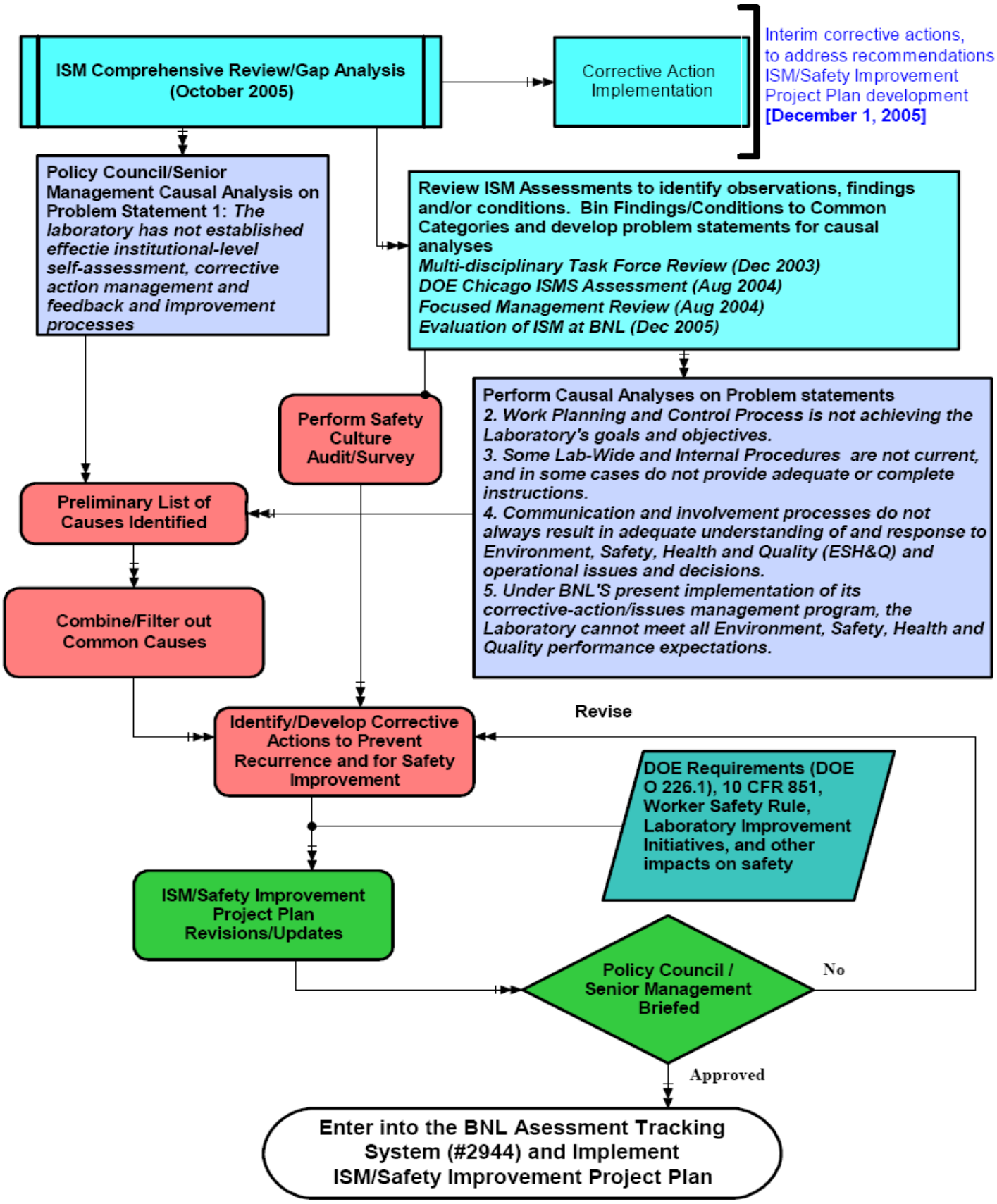
Problem areas 1 and 5 had many similarities, and, as a result were categorized as an institutional ISM Program deficiency. The senior management of the Laboratory conducted the causal analysis for this institutional-level feedback and improvement deficiency, assisted by a trained causal analysis subject matter expert (SME).

Separate causal analyses were conducted for the remaining three problem areas (2 through 4) by groups of BNL managers, supervisors and workers utilizing TapRoot and the "questioning to the void" ("Five Whys") technique. Each cause was binned using the causal analysis tree from the DOE Occurrence Reporting Causal Analysis Guide.

In addition, a safety culture survey was performed with several groups, combining interactions between safety SMEs and the groups, with written surveys. Either the Laboratory Director or one of the Deputy Directors provided opening remarks at each of the survey sessions. They followed a process recommended by J. M. Stewart in his book "Managing for World Class Safety." The results of the survey will be analyzed in detail as part of the ESS&H SFA. Improvement actions and opportunities for improvement have been, and will continue to be incorporated into this improvement plan as appropriate.

After completing the causal analyses and the survey, corrective actions were identified to address the direct and root causes. These corrective actions are designed not only to address deficiencies, but to strengthen the safety culture and prevent future recurring findings. Figure 1 illustrates the development process for the ISM/Safety Improvement Project Plan.

Figure 1, ISM/Safety Improvement Project Plan Development Flow Chart



IV Integrated Project Team

The BHSO, BNL and BSA Operations Risk Committee have implemented an integrated team approach to managing the ISM/Safety Improvement Project. The following roles and responsibilities address the overall management decision-making for the approval, authorization, and change control of the ISM/Safety Improvement Project. Figure 2 illustrates the ISM/Safety Improvement Project Organization structure.

IV.a Department of Energy Brookhaven Site Office (DOE-BHSO)

To assure that BHSO is apprised of the performance of the ISM/Safety Improvement Project, BNL will:

- Report project progress monthly to the BHSO ISM Champion;
- Notify BHSO of deletions/additions to the ISM/Safety Improvement Plan;
- Notify BHSO of any extended due dates for corrective actions under the plan; and
- Include the BHSO Champion in progress/status meetings.

IV.b Brookhaven Science Associates Board

The BSA Board Operations Risk Committee will maintain oversight, and provide BSA corporate input on the implementation of this Plan on behalf of the Board. The Committee will be formally briefed on the status of the ISM/Safety Improvement Project at each of their quarterly meetings, and will receive written progress reports between meetings.

The Operations Risk Committee will brief the Board of Directors at each Board meeting. In addition, the Committee will conduct oversight through the corporate assurance process, to include external reviews (“deep dives”) of progress on the Project Plan.

IV.c BNL Management

Laboratory Director
The Laboratory Director has the authority and responsibility for managing BNL programs and facilities. The BSA Board has charged the Director with the responsibility of attaining a comprehensive, robust and credible ISM Program, and successfully completing this ISM/Safety Improvement Project.

Deputy Director for Operations
The Deputy Director of Operations (DDO) was tasked by the Laboratory Director as the sponsoring senior manager for this project to afford overall project policy, guidance and oversight for implementing the ISM/Safety Improvement Project. The DDO will report project’s progress monthly to the Laboratory’s Policy Council.

Policy and Strategic Planning Office

The Assistant Laboratory Director (ALD) for Policy and Strategic Planning (P&SP) is responsible for assuring that critical institutional level commitments of this plan are reflected in objectives defined in applicable SFAs and associated institutional level resource allocation. The ALD for P&SP will also report progress/status of this plan against institutional level objectives to the Policy Council.

ISM/Safety Improvement Project Manager

The Project Manager has full responsibility and authority for carrying out the ISM/Safety Improvement Project in a manner consistent with this project plan. The project manager reports to the DDO. The project manager has the continuing responsibility to manage implementation of ISM/Safety Improvement project objectives. In fulfilling this vision the project manager is responsible for:

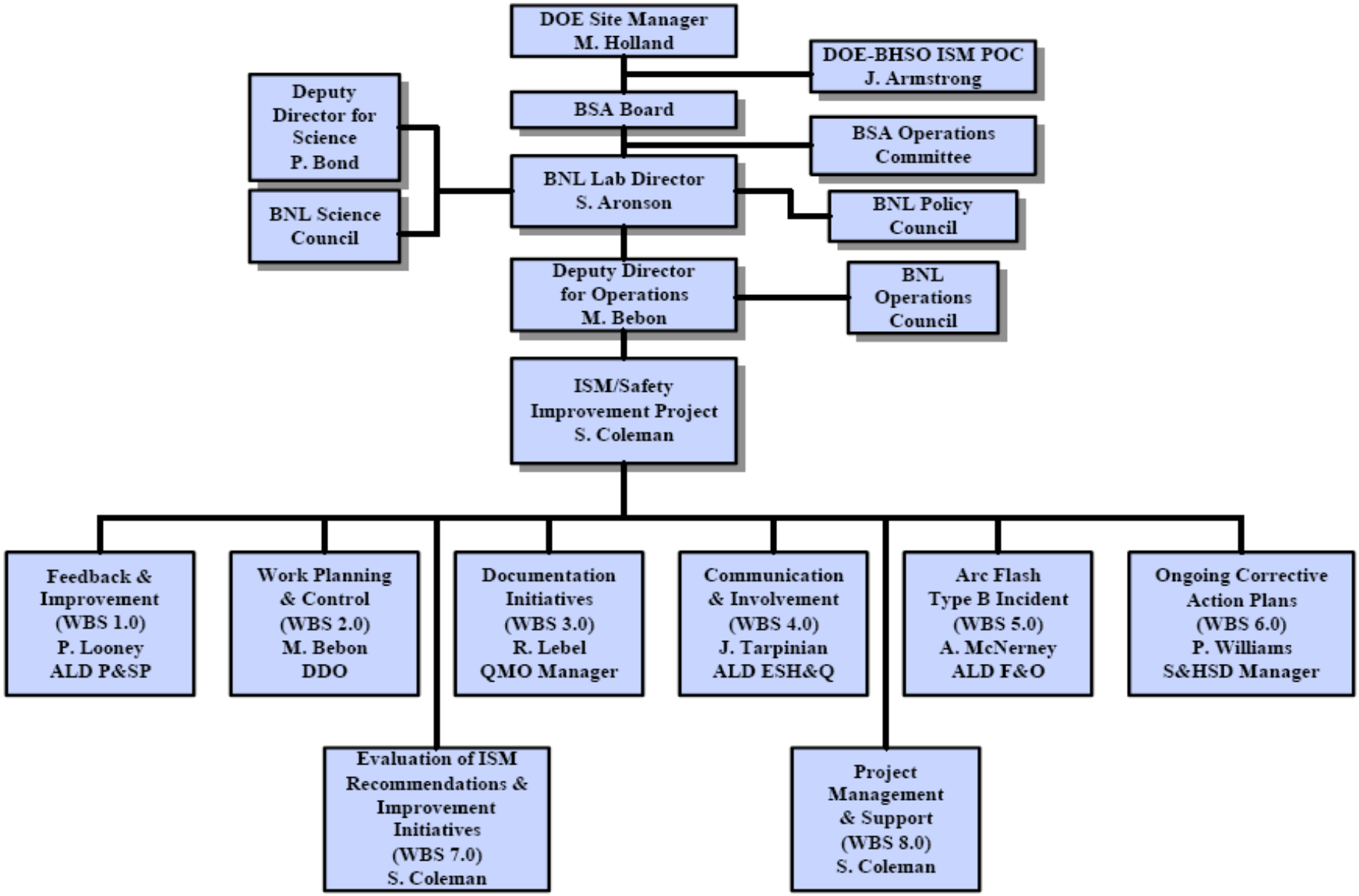
- Establishing goals and performance indicators to guide project efforts and measure progress.
- Developing, maintaining and tracking project tasks and activities.
- Holding managers responsible and accountable for successfully executing project objectives by the delivery of SME's and contributed resources.
- Managing resources to support execution of the project's activities.
- Communicating accurate project status, and performance issues to BNL Senior Management.
- Identifying and managing critical issues and risks that may impact project performance.
- Utilizing appropriate BNL subject matter experts to prepare and review key program documents, and oversee development of documents to assure compliance with DOE ISM requirements.
- Identifying, preparing, and managing documentation required to successfully manage the project.

ESH&Q Assistant Laboratory Director

The ESH&Q ALD is responsible for the active participation of ESH&Q Directorate Divisions/Offices as well as guiding the ISM project manager in fulfilling requirements of the project plan including ESH&Q responsibilities. Specific responsibilities include:

1. Delivering the necessary subject matter experts and resources required for project success.
2. Supporting the project manager by identifying critical issues that may impact project performance, and offering advice to ensure its timely resolution.
3. Striving to remove any barriers to the ISM/Safety Improvement Project.

Figure 2, ISM/Safety Improvement Project Organization Structure



V Work Breakdown Structure (WBS) and WBS Elements

Figure 3 illustrates the high level WBS elements. The ISM/Safety Improvement Project elements are divided into eight main categories: 1.0 – Institutional Feedback and Improvement, 2.0 – Work Planning and Control, 3.0 – Documentation, 4.0 – Communication and Involvement, 5.0 – Collider Accelerator Arc Flash incident, 6.0 – Ongoing Action Plans, 7.0 – "Evaluation of ISM at BNL" Recommendations and Improvement Initiatives, and 8.0 – Project Management and Support.

WBS 1.0 – Institutional Feedback and Performance Improvement Initiatives

This activity involves improving current processes, and developing and implementing new elements of the planning and performance management process. The work will build on a SFA framework developed by Laboratory senior management at a retreat on January 9th and 10th, 2006. The plan contains four thrust areas, briefly described below (WBS 1.1-1.4). They are discussed in detail under section 1.0. Specific actions were developed to assure institutional responsiveness to the conditions, causes, and recommendations related to ISM Core Function 5, Feedback and Improvement.

WBS 1.1 – **Laboratory Strategy Focused Framework –** Includes identifying SFA Champions and establishing SFA working groups. The latter will define goals, identify and evaluate/characterize risks, identify appropriate measures and, as necessary, corporate and institutional level risk limits, and identify areas where institutional focused assessments should be performed.

WBS 1.2 – Institutional Decision Making Assurance Processes – Includes developing a capability that utilizes data, experience, and expertise to inform the Laboratory senior management of SFA progress towards objectives, ability to maintain performance within established institutional risk limits, to identify any new opportunities and/or emerging risks, and to verify the effectiveness of investments made to mitigate risks and/or resolve deficiencies. Under this WBS element, a "needs assessment" and "gap analysis" for each SFA will be conducted, and associated plans developed to improve analysis capabilities.

WBS 1.3 – Align Resource Allocation Processes – This WBS element will refine and align the processes in institutional level budget development, allocation, and execution processes with the strategic agenda. This WBS element will also drive accountability for organizational performance against established institutional level objectives, and the integration of the budget decision-making calendar and processes with the planning and performance monitoring calendar.

WBS 1.4 – Verify Sustainability and Effectiveness – Includes assurance that DOE and management expectations are clearly understood and effectively implemented, a review and update of senior management's R2A2s for applicable and appropriate expectations, update senior management performance plans goals to reflect expectations for strategy execution and performance assurance within their respective organizations. It also covers an evaluation of

the overall effectiveness of institutional feedback and performance improvement reengineering.

WBS 2.0 – Work Planning and Control Performance Improvement Initiatives

Work under this element includes revising/updating the Work Planning and Control Management System and subject areas to further define the screening process and integrate the job risk and facility risk assessments into work planning and control at BNL. It also covers defining and clarifying the skill-of-the-worker process, methodologies and qualifications for work control managers and coordinators.

WBS 2.1 – Work Performance Improvement Initiatives – Activities under this WBS element include: (1) creating a culture of "All Work is Planned" (i.e. hazards are identified, mitigated and the work executed as planned) and supporting procedures and methodologies, (2) clarifying building manager roles in work planning and control process, (3) improving the ISM flow down process to subcontractors and vendors, (4) specifying job change control expectations, (5) integrating human performance factor and principles into work planning and control, and (6) upgrading the assessment plan for the Work Planning and Control Management System to include risks and quantitative measures to track and report its performance.

WBS 2.2 – Work Planning and Control Qualifications and Training – The WBS element here encompasses establishing the qualifications and training requirements for all Work Control Managers and Coordinators, and revitalizing the Work Planning and Control Training Program.

WBS 3.0 – Documentation Improvement Initiatives

This WBS element relates to updating SBMS documentation essential to the ISM Program to reflect current practices, expectations, and commitments.

WBS 3.1 – Key Programmatic Document Initiatives – Includes ensuring that management systems and program descriptions were reviewed, revision/issue dates updated and reflected in SBMS on-line documents, and strengthening processes for developing and implementing SBMS documents (i.e. Laboratory-wide Procedures and Internal Controlled Documents development).

WBS 3.2 – Requirements Management and SBMS Processes– Includes the rollout and implementation of the electronic record of decision tool, management system requirements verification, mapping contract requirements to management systems, and verifying current content of standard operating procedures, standard practice instructions, handbooks, and manuals that reside in SBMS.

WBS 4.0 – Communication and Involvement Initiatives

Activities herein include line management communicating safety expectations to staff, visitors and guests. Actions within the preceding WBS elements address the communication and involvement underlying and root causes identified from the causal analysis. The action items and initiatives described under WBS 1.0 address the accountability and performance expectations of line management. Activities under this element are targeted at communicating changes to SBMS documents, procedures, methodologies and processes.

WBS 4.1 – New / Revised Document Communications – activities under this element include communicating/explaining the revisions to SBMS documents to affected stakeholders Quality Assurance (QA) Representatives, ES&H Coordinators, Procedure Managers, Work Control Coordinators).

WBS 5.0 – Collider Accelerator Department Arc Flash Type B Incident

This WBS element includes those activities associated with and arising out of the arc flash incident. The Laboratory developed a set of actions designed to further assess its associated causal factors, and to revisit the effectiveness of existing plans, policies, and processes.

WBS 5.1 – DOE Team Interim Recommendations – The interim recommendations of the Type B Team and the Laboratory's corrective actions to address them are included.

WBS 5.2 – BNL Corrective Actions – In addition to implementing the interim recommendations of the DOE Type B team, the Laboratory identified several additional actions that will be taken to further understand the causal factors associated with the event, and to ensure that they are corrected.

WBS 5.3 – BNL Arc Flash Corrective Actions Approved by DOE

WBS 6.0 – Ongoing Action Plan Tracking/Follow-Up

These WBS elements include tracking and follow up on the ongoing corrective action plans BNL developed and implemented to resolve safety and health program. Recent assessments of the Laboratory's Worker Safety and Health Program revealed that implementation is not consistent with management systems requirements. Accordingly, BNL established corrective action plans to resolve safety and health program issues. Implementing them is essential to improving BNL's ISM program.

WBS 6.1 – OSHA Assessment Action Plan

WBS 6.2 – Material Handling and Rigging Action Plan – This action plan addresses the Noncompliance Tracking System (NTS) report NTS-CH-BH-BNL-BNL-2004-1, "Recurring Material Handling Problems."

WBS 6.3 – Industrial Hygiene Action Plan

WBS 6.4 – Electrical Safety Action Plan

WBS 6.5 – Authority Having Jurisdiction (AHJ) Nationally Recognized Testing Laboratory (NRTL) Action Plan

WBS-6.6 -- Inadequate Control of Procedures Action Plan – The actions under this WBS element address the NTS report NTS-CH-BH-BNL-BNL-2005-0001, "Inadequate Control of Procedures."

WBS 7.0 – "Evaluation of ISM at BNL" Assessment Recommendations and Improvement Initiatives

This WBS element details the activities necessary to address recommendations from "Evaluation of ISM at BNL" (October 2005) that are organization specific and do not indicate BNL-wide applicability, they cover analysis and implementation of worker safety and health rules, and initiatives aimed at improving safety performance.

WBS 7.1 – "Evaluation of ISM at BNL" Assessment Recommendations – Beyond the "Evaluation of ISM at BNL" and programmatic deficiencies, the review team offered BNL with several recommendations and opportunities for improvement. Many of them spoke to organization specific problems that did not rise to BNL-wide applicability. Activities under this WBS element detail those corrective actions that address the recommendations and/or opportunities for improvement.

WBS 7.2 – Worker Safety and Health Program – The successful implementation of the Worker Safety and Health Rule is tied to the implementation and effectiveness of the Laboratory's existing safety and health program. The activities under this element focus on identifying gaps in 10CFR 851, Worker Safety and Health Rule, and undertaking activities needed to meet the intent of 10CFR851.

WBS 7.3 – Safety Improvement Initiatives – This activity focuses on defining excellence in ESS&H and activities required to achieve excellence.

WBS 8.0 – Project Management and Support

This WBS element includes administrative support, consulting services, SME support, attending ISM champion workshops, and training to support and enhance ISM implementation at BNL.

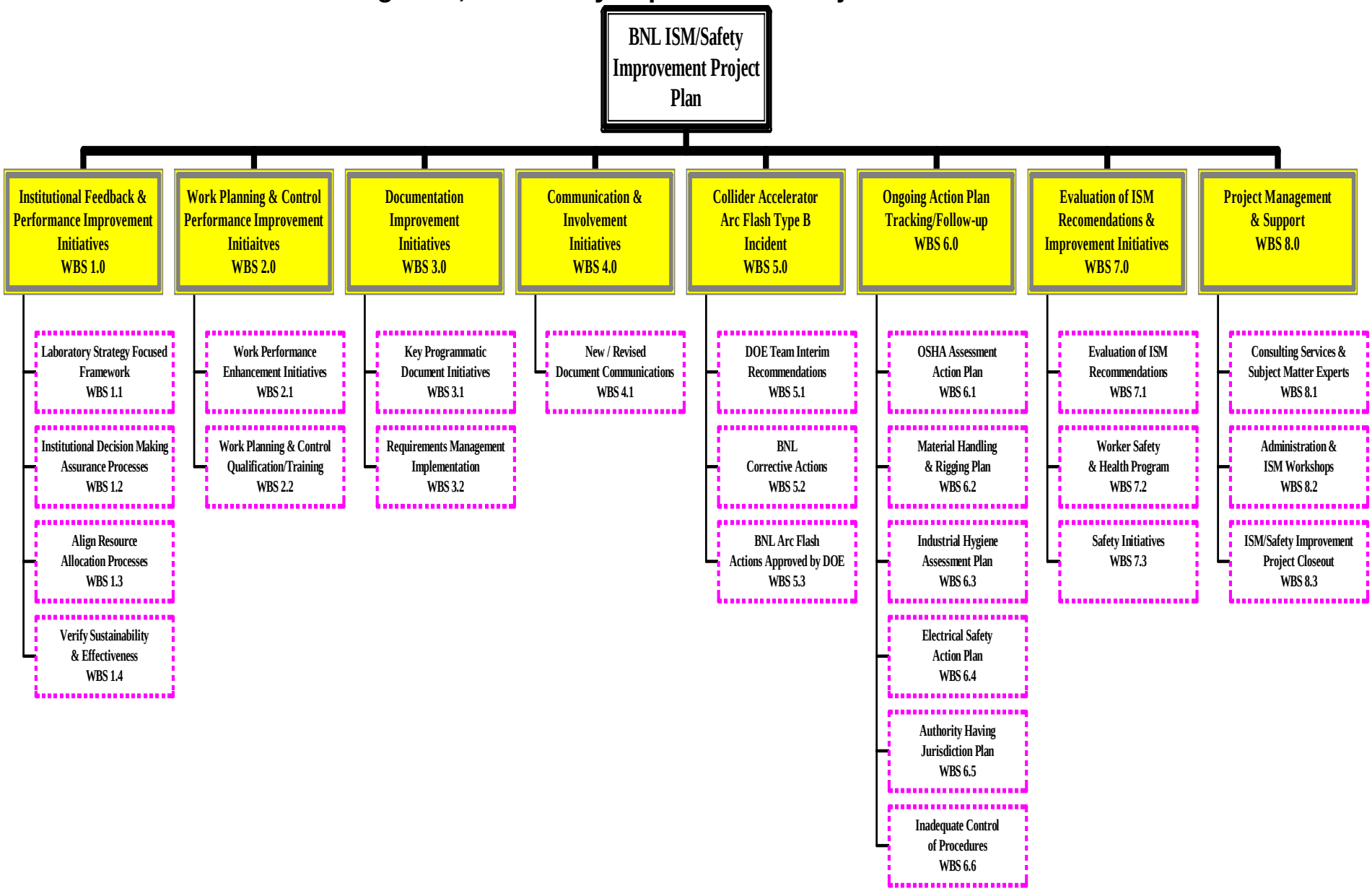
WBS 8.1 – Consulting Services and Subject Matter Experts (SMEs) – Includes assembling a highly credible team of recognized experts with a broad understanding of ISM and Laboratory operations to carry out a follow-up review to the October 2005 "Evaluation of ISM at BNL" assessment.

WBS 8.2 – Administration and ISM Workshops – Includes computer set up, training and badging for consultants, travel to and participation in DOE ISM Champion workshops, and project administration support.

WBS 8.3 – ISM/Safety Improvement Project Closeout – Involves preparing a closeout review of an effectiveness of corrective actions, the objectives of which are to:

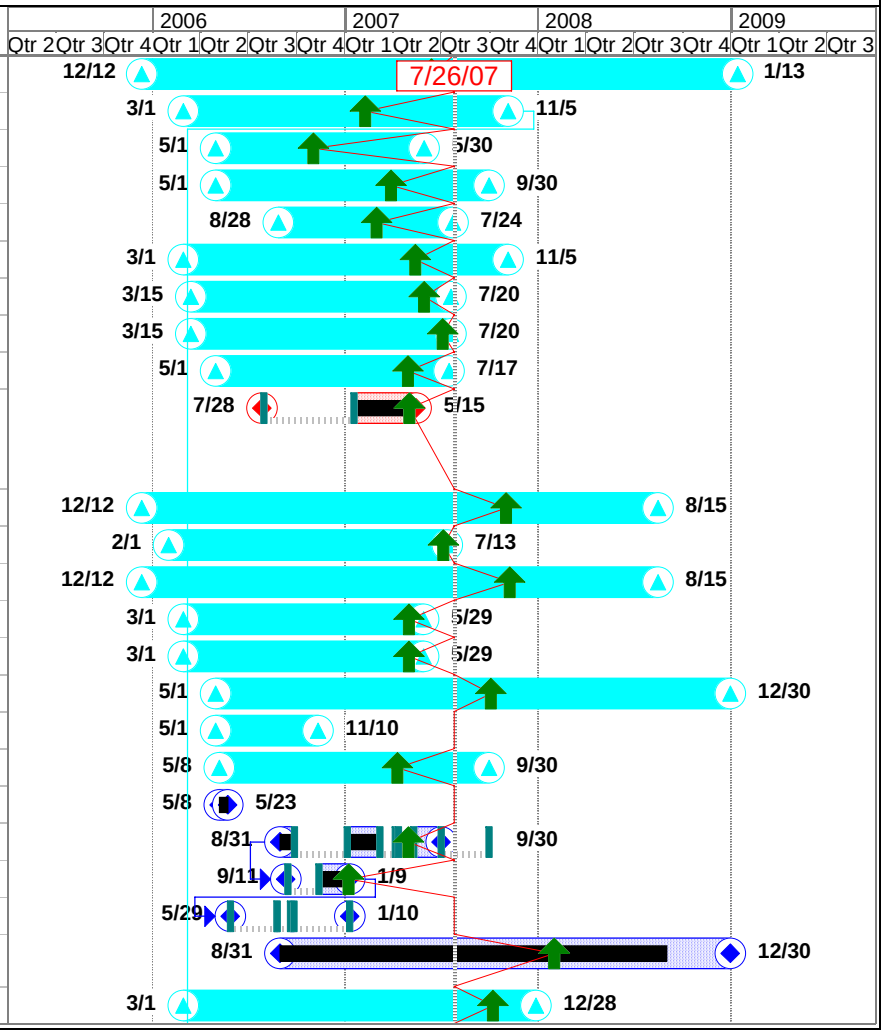
- Verify the successful closure of each finding.
- Determine if corrective actions have effectively resolved the finding to prevent recurrence, or determine the reasons the corrective actions are ineffective.
- Address ineffective corrective actions by identifying additional corrective actions to resolve the finding and prevent recurrence.
- Collect and follow-up results for effectiveness reviews of corrective actions for subsequent analysis and lessons learned.

Figure 3, ISM/Safety Improvement Project Plan WBS



BNL ISM/Safety Improvement Project Plan (ATS# 2944)

ID	WBS	Task Name	% Complete
1	**0**	**BNL ISM/Safety Improvement Project**	**91%**
2	**1.0**	**Institutional Feedback & Performance Improvement Initiatives**	**91%**
3	**1.1**	**Laboratory Strategy-Focused Framework**	**100%**
8	**1.2**	**Institutional Decision Making and Assurance Processes**	**95%**
15	**1.3**	**Align Resource Allocation Processes**	**100%**
19	**1.4**	**Verify Sustainability & Effectiveness**	**69%**
30	**2.0**	**Work Planning & Control Performance Improvement Initiatives**	**95%**
31	**2.1**	**Work Performance Improvement Initiatives**	**100%**
62	**2.2**	**Work Planning and Control Qualification/Training**	**86%**
74	2.3	WP&C Management System and Subject Area Revisions/Updates. Includes the process for worker planned work, clarify the role of building managers, flowdown to subcontractors, training, job change control and human	90%
75	**3.0**	**Documentation Improvement Initiatives**	**88%**
76	**3.1**	**Key Programmatic Document Initiatives**	**100%**
96	**3.2**	**Requirements Management Implementation**	**79%**
106	**4.0**	**Communication & Involvement Initiatives**	**100%**
107	**4.1**	**New / Revised Document Communications**	**100%**
114	**5.0**	**Collider Accelerator Arc Flash Type B Incident**	**85%**
115	**5.1**	**DOE Type B Team Interim Recommendations**	**100%**
129	**5.2**	**BNL Arc Flash Corrective Actions**	**67%**
130	5.2.1	Human Performance -Based Accident Investigation	100%
131	5.2.2	Electrical Safety Assessment	60%
132	5.2.3	Electrical Safety Effectiveness Review	100%
133	5.2.4	Lessons Learned Review	100%
134	**5.3**	**BNL Arc Flash Corrective Actions Approved by DOE [These actions are being tracked in ATS 3474]**	87%
135	**6.0**	**Ongoing Action Plan Tracking/Follow-Up**	**88%**

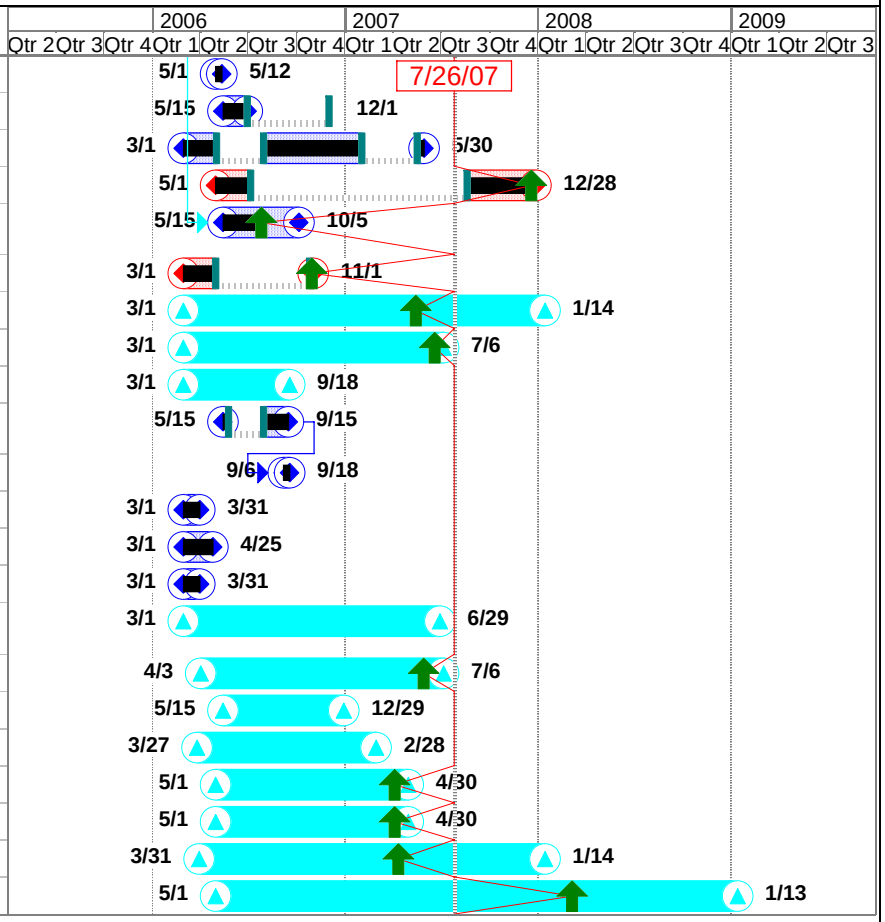


Project: Safety Improvement Schedule
Date: Thu 7/26/07

Task	Summary	Split	
Task Progress	Rolled Up Task	External Tasks	
Critical Task	Rolled Up Critical Task	Project Summary	
Critical Task Progress	Rolled Up Milestone	Group By Summary	
Milestone	Rolled Up Progress	Deadline	

BNL ISM/Safety Improvement Project Plan (ATS# 2944)

ID	WBS	Task Name	% Complete
136	6.1	OSHA Assessment Action Plan	100%
137	6.2	Material Handling & Rigging Plan (ATS 1948)	100%
138	6.3	Industrial Hygiene Plan (ATS 2823)	100%
139	6.4	Electrical Safety Action Plan (ATS 2725)	95%
140	6.5	Authority Having Jurisdiction (AHJ) Nationally Recognized Testing Laboratory (NTRL) Action Plan	50%
141	6.6	Inadequate Control of Procedures (ATS 2935)	95%
142	**7.0**	**Evaluation of ISM Recommendations & Improvement Initiatives**	**97%**
143	**7.1**	**Evaluation of ISM Recommendations/Opportunities for Impro**	**99%**
144	**7.1.1**	**Radiological Protection Plan Revision**	**100%**
145	7.1.1.1	Revise the RPP scope statement to clarify the requirements of 10CFR835 for off-site radiological	100%
146	7.1.1.2	Communicate RPP requirements to applicable Manage	100%
147	7.1.2	Radiological Awareness Report (RAR) Performance Ex	100%
148	7.1.3	Waste Management Representative Support Services E	100%
149	7.1.4	Life Sciences Safety Culture/Performance Expectations	100%
150	**7.1.5**	**Conduct of Operations Evaluation and Implementation**	**100%**
155	**7.1.6**	**Nuclear Safety Authorization / Readiness**	**97%**
163	**7.1.7**	**Operating Experience / Lessons Learned Initiatives**	**100%**
167	**7.1.8**	**Construction Safety Subject Area review/Update**	**100%**
169	**7.2**	**Worker Safety & Health Program Implementation**	**95%**
170	**7.2.1**	**Worker Safety & Health Rule Implementation**	**95%**
176	**7.3**	**Safety Improvement Initiatives**	**96%**
188	**8.0**	**Project Management and Support**	**80%**



Project: Safety Improvement Schedule
Date: Thu 7/26/07

Task		Summary		Split	
Task Progress		Rolled Up Task		External Tasks	
Critical Task		Rolled Up Critical Task		Project Summary	
Critical Task Progress		Rolled Up Milestone		Group By Summary	
Milestone		Rolled Up Progress		Deadline	

V.a Corrective Actions – Evaluation of ISM at BNL: Causal Analysis Results

This section details the problem areas identified from the Evaluation of ISM and previous assessments, and the corrective actions necessary to prevent recurrence of ISM deficiencies. Each sub-section describes the problems, the associated observations identified from the assessments and summarizes the direct and root causes from causal analyses, and corrective actions.

Following the findings from the Evaluation of ISM conducted in October 2005 and several safety assessments over the past two years, for example, FY04 Multidisciplinary Task Force Review, FY04 DOE Chicago Office ISMS assessment, FY05 BNL Management System Self-assessment Program, and FY05 ISM Focused Management Review), BNL undertook a comprehensive review/evaluation to determine why recurring deficiencies continue to recur. The BNL team identified 123 observations, findings and concerns that warranted further investigation. They were analyzed and binned into five problem areas: feedback and improvement; work planning and control; procedural deficiencies; communications/training; and corrective action management.

After the problem areas were defined, a causal analysis was performed on each utilizing the questioning to the void approach (5 Whys), and the TapRooT root cause tree analysis to identify all the particular parameters causing the problem, including management and supervisory influences that affect workers' behaviors. A summary of these causes is given for each problem area. Each cause was also linked to the causal analysis tree in the DOE Occurrence Reporting Causal Analysis Guide.

BNL developed corrective actions for all root and significant contributing/underlying causes and included needed actions for verification of effectiveness. Included for each problem area is a description of the corrective action, applicable management system, management system steward, action owner (individual responsible for completing the action item), and target completion date. Table 1, at the end of this section, show how the causes, recommendations from the FYO5 "Evaluation of ISM at BNL" and corrective actions relate to one another.

1.0 Institutional Feedback and Performance Improvement Initiatives

Problem Statement: The Laboratory has not established effective institutional-level self-assessment, corrective action management, and feedback and improvement processes.

A. <u>Supporting Observations from Assessment Activities:</u>

1. There is no effective process in place to systematically prioritize, on the basis of risk and within the framework of a laboratory-wide annual agenda, the various adverse ESH&Q and operations-related conditions identified through internal and external assessments for which holistic and sustainable corrections are needed or expected *[FY06 Evaluation of ISM at BNL].*
2. Major assessments (e.g. FY 04 DOE Chicago ISM Assessment, FY 05 ISM Assessment Follow-up Review, and FY05 ISM Focused Management Review) with cross cutting issues have not been adequately addressed. Recommendations to strengthen and reduce injuries from initiatives such as from the DuPont assessment

have not been systemically addressed by senior management. Corrective actions taken were not enough to prevent recurrence *[FY06 Evaluation of ISM at BNL]*

3. BNL has not established all of the elements of a robust and effective Contract Assurance Process. DOE Order 226.1 establishes high expectations for issues management, specifically determining the risk significance, and priority of deficiencies, evaluating the scope and extent of condition or deficiency, identifying root causes, verification that corrective actions are complete, and validation that corrective actions are effective *[FY06 Evaluation of ISM at BNL].*

B. Causal Analysis Summary

Three direct causes were identified:

1. The set of functions that capture, analyze, and communicate institutional-level performance information have not been fully established and/or implemented. Mechanisms to evaluate the efficacy or impact (costs and benefits) of initiatives or corrective actions are not sufficiently robust or lacking. *ORPS Cause Codes: A4B1C01, Management Policy guidance/expectations not well defined, understood, or enforced, and A4B1C09, Corrective action for previously identified problem or event was not adequate to prevent recurrence*
2. A sufficient set of processes and associated expectations for the reporting of important conditions and/or issues, which might require timely action by the senior laboratory management, have not been developed and implemented. *ORPS Cause Code A4B1C01, Management Policy guidance/expectations not well defined, understood, or enforced.*
3. Laboratory Senior Management has not sufficiently defined and executed their roles and responsibilities for institutional-level performance. *ORPS Cause Code A4B1C01, Management Policy guidance/expectations not well defined, understood, or enforced.*
4. **The root cause was determined to be:** The Laboratory has not defined the strategic outcomes it would need in order to (*ORPS Cause Code A4B1C01, Management Policy guidance/expectations not well defined, understood, or enforced)*:
    i. Establish a full range of (scientific, operational, and stakeholder relations, etc.) performance objectives,
    ii. Identify and convey to senior managers the individual, organizational, and management system expectations,
    iii. Systematically and rigorously assess and improve institutional performance, and
    iv. Establish expectations for reporting of conditions and issues affecting the institution.

C. Feedback and Improvement Corrective Actions

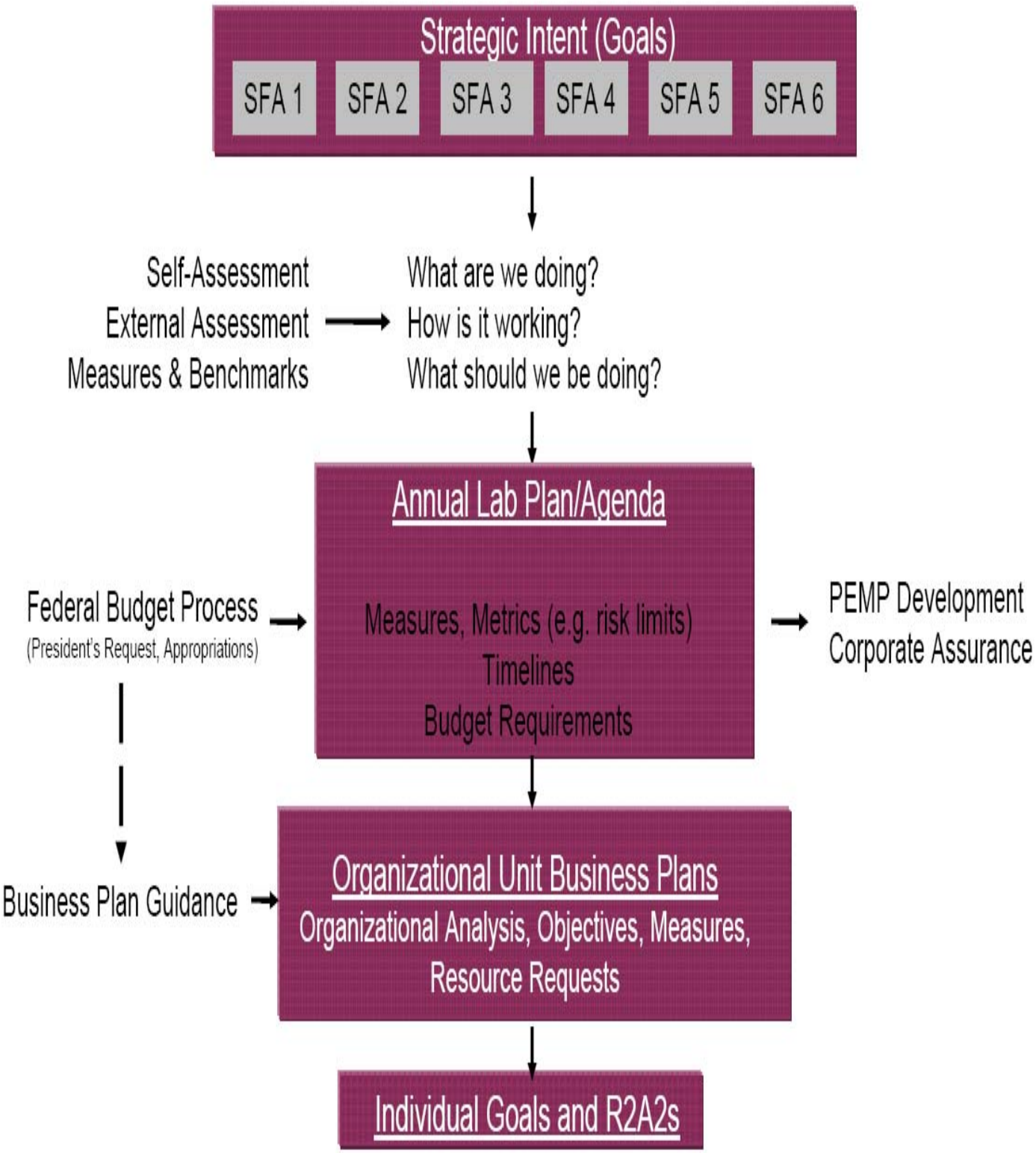
BNL developed a Performance Management Improvement Plan to build on the SFA framework discussed in section 2.3. The framework will help focus the Laboratory's management on elements while fostering a comprehensive view of the most significant factors that affect the viability of the Laboratory's scientific mission (e.g. scientific productivity, stakeholder relations, safety, security, and costs). The improvement effort encompasses four thrust areas:

1. **Adopt a strategy-focused framework for Laboratory-wide planning, decision-making, and performance management.**
2. **Evolve an institutional performance and risk analysis to improve feedback to institutional decision-making and assurance processes.**
3. **Align decision and budget-allocation-processes with Laboratory's performance objectives.**
4. **Verify the sustainability and effectiveness of the performance management processes.**

The Performance Management Improvement Plan involves improving current processes, as well as developing and implementing new elements of the planning process, which will take time to develop and mature. The sequence and schedule of actions are based on the need to: (1) allow for time for the development and maturation of new core processes and practices (e.g. business planning), (2) simultaneously improve on-going processes (e.g. self-assessments and performance monitoring), (3) monitor and address on-going priority issues of performance, such as ISM performance, and (4) integrate and ultimately supplant some existing planning, decision, and performance-management activities which continue as improvements are established (for example, Contract Performance Evaluation and Measurement Plan (PEMP) development).

Specific actions were taken to (1) assure institutional responsiveness to the causes discussed above, (2) respond to recommendations made by the ISM review team (included in Appendix 1 of the Evaluation of ISM at BNL Report), and (3) assure the DOE's requirements and expectations are met for feedback, improvement, and assurance processes (viz. DOE O 226.1, DNFSB 2004-1 Feedback and Improvement Criteria and Review Approach Document [CRAD]). Figure 4 illustrates the Strategic/Integrated Planning Process.

Figure 4, Strategic/Integrated Planning Process



Corrective Action WBS-1.1:
Adopt a Strategy-Focused framework for Laboratory-wide planning, decision, and performance management.

This statement represents the cornerstone of improving performance management at the Laboratory. The SFA framework will be followed. SFA Champions will be identified and SFA working groups established. The Laboratory Director will charge them to help develop the necessary SFA planning and evaluation documents. Specifically the SFA working groups will define goals, identify and evaluate/characterize risks, suggest appropriate measures and, as necessary, corporate- and institutional-level risks limits, and highlight areas where institutional focused assessment activities should be undertaken. While the process will be initiated in the near-term, SFA planning and evaluation documents are expected to be fully mature after approximately 2 years as actions progress in other thrust areas (e.g., performance analysis capabilities).

To support the implementation of the SFAs we will develop and establish an integrated calendar of planning and performance-monitoring work that meets and integrates the needs and requirements of Laboratory management and the DOE, such as in PEMP development and reporting, corporate assurance and contractor assurance. This calendar will include defining and scheduling significant management retreats and integrating performance and assurance-reporting processes in accordance with the DOE and BSA's expectations.

The planning, decision, and performance management process will be aligned with management's fundamental beliefs and practices. Brookhaven executives and managers have varying skills, knowledge, experience, and perspectives on management principles and practices. Therefore, this element will encompass an executive and management symposia to assist in aligning management's thinking and approaches with best practices employed by successful businesses and institutions.

Management System: Integrated Planning
Management System Steward: J. Patrick Looney
Action Owner: Doug Ports/R. H. Lebel

Specific Actions	Target Completion Date
Complete initial SFA Planning and Performance Management Documents	September 30, 2006 ***Completed***
Develop, Publish, and Implement Integrated Planning and Performance Management/Assurance Calendar	September 30, 2006 ***Completed***
Realign Quarterly Institutional Level Reporting Along SFA Framework	December 31, 2006 ***Completed***
Define and Implement Management Symposia	May 30, 2007 ***Completed***

Corrective Action WBS-1.2:
Evolve institutional performance and risk analysis to improve feedback to institutional decision-making and assurance processes.

Transition to a strategy-focused institution will require new and better analysis methods and abilities. It is critical to understand institutional level opportunities and risks define priorities, allocate resources, and to evaluate the effectiveness of institutional improvements.

While some capability exists at the Laboratory, particularly for event driven analysis, we have not systematically and comprehensively evaluated and developed expertise, processes, practices and tools for analyzing institutional performance. A particular need is for evaluating relative risks, assessing beliefs and culture related to institutional performance, assuring effectiveness and efficiency of institutional business/work management processes, and comparing institutional performance against external benchmarks of competitiveness and excellence in performance.

The issues involved in developing these abilities greatly depend on the specific nature of the SFAs and the associated processes and practices. Ultimately, SFA Councils will be developed which will have a vital role in defining approaches and conducting on-going analysis for their respective focus area. They will utilize data, experience, and expertise to inform the Laboratory's senior management of SFA progress towards its objectives, ability to maintain performance within established institutional risk limits, to identify any new opportunities and/or emerging risks, and to verify the effectiveness of investments made to mitigate risks and/or resolve deficiencies. This area will conduct a "needs assessment" and "gap analysis" for each SFA and propose plans to improve our capabilities for analysis.

This thrust area also will define and deploy the analysis approaches used by each SFA Champion and Council.

Management System:	Integrated Planning
Management System Steward:	J. Patrick Looney
Action Owner:	T. Baker/R. H. Lebel

Specific Actions	Target Completion Date
Document/Define the Contractor Assurance Process in accordance with DOE O 226.1 Requirements	September 30, 2006 ***Completed***
Establish Institutional Prioritization Framework	March 30, 2007 ***Completed***
Renew Event/Issues Management Processes	December 31, 2006 ***Completed***
Upgrade/Re-Tool the Assessment Tracking System	February 28, 2007 ***Completed***
Establish Common Institutional Level Data Collection and Reporting Process and Tool	September 30, 2007
Define and Develop SFA Analysis Capability	September 30, 2007

Corrective Action WBS-1.3:
Align resource allocation processes with Laboratory performance objectives

The effectiveness of institutional-level decisions and resource allocations depend on a well-defined strategic agenda and a well characterized risk profile. Because we have not systematically and comprehensively defined them, we lack a framework to adequately integrate processes of budget decisions. Accordingly, this thrust area will refine and align institutional-level budget development, allocation, and execution processes with the strategic agenda.

Additionally, just as the individual/personal goal planning and evaluation/compensation processes drive individual performance, the comparable institutional processes must support the desired organizational behaviors required to achieve institutional objectives. For example, if there is an institutional expectation for safety excellence and efficiency in safety, the business-planning process must drive accountability for those expectations at the organizational level.

Under this thrust area we will also integrate the budget decision-making calendar and processes with the planning and performance-monitoring calendar.

The success of these activities is largely contingent upon our ability to adequately conduct the necessary analysis and define institutional priorities. Therefore, work under this thrust area is expected to lag the development of the SFA and the performance analysis thrust areas.

Management System: Integrated Planning
Management System Steward: J. Patrick Looney
Action Owner: Teresa Baker

Specific Actions	Target Completion Date
Refine and Redefine Institutional Level Discretionary Allocation Processes	July 31, 2007 ***Completed***
Integrate Decision and Budget Allocation Processes into Planning and Performance Management/Assurance Calendar	May 30, 2007 ***Completed***
Define and Implement an Organizational Unit Business Planning Process	July 30, 2007 ***Completed***

Corrective Action WBS-1.4:
Verify sustainability and effectiveness of the performance management processes

Actions under this thrust area will assure that the DOE's and management's expectations are clearly understood and effectively implemented.

A key element of driving performance management effectiveness and sustainability is a clear, consistent understanding of management's roles and responsibilities for strategy formation, execution, and performance assurance. Therefore this thrust area will include a review and update of senior management's R2A2s to encompass the appropriate expectations. Senior management's performance plans/personal goals also will be updated to reflect expectations for executing strategy and performance assurance within their respective organizations. We will redefine the roles and practices of the various councils that support BNL's management and establish new ones, where necessary.

An evaluation of organizational structure to assure optimal performance of key planning, decision, and performance-management processes will be conducted under this thrust area. Specifically we will address the adequacy of institutional commitment to independent oversight which is a potential issue identified by the ISM review team.

In addition to assuring optimal organizational structure, an evaluation of the overall effectiveness of the reengineering effort will be assessed under this thrust area. It will verify institutional awareness and acceptance as well as the adequacy and effectiveness of key performance-management processes, such as SFA planning, analysis, and decisions on resource allocation.

Specific Actions	Target Completion Date
Complete comprehensive gap analysis against key program design input requirements and expectations (e.g. DOE O 226.1, DFNSB 2004-1, Feedback and Improvement CRADS, OMB A-123)	July 20, 2006 ***Completed]***
Update ISM/Safety Improvement Project Plan as necessary to address gaps identified under task above.	July 30, 2006 ***Completed***
Review and refine as necessary Roles and Practices of Institutional Councils	September 30, 2006 ***Completed***
Complete analysis of the adequacy institutional commitment to independent oversight (Third Party Quality Assurance Review)	August 30, 2006 ***Completed***
Review and update as necessary Senior Management Roles, Responsibilities, Authorities and Accountabilities (R2A2s) and performance plans/personal goals to reflect strategy execution, assurance, and management system requirements.	February 28, 2007 ***Completed***
The comprehensive gap analysis against key program requirements identified that BNL has not established requirements and formal processes to ensure that personnel responsible for managing and performing assurance activities possess appropriate experience, knowledge, skills and abilities commensurate with their responsibilities. BNL will establish requirements to address the identified gap.	December 30, 2006 ***Completed***
Review Organizational Roles, Structure, and Resources and make necessary changes to optimize effectiveness and efficiency of on-going administration of performance management processes	June 30 2007 ***Completed***
Review and update, as necessary, middle management (Level 2) and staff R2A2s and performance plans/personal goals to reflect their role in strategy execution and performance assurance	September 30, 2007
Establish and implement a process to verify personnel responsible for managing and performing assurance activities possess appropriate experience, knowledge, skills and abilities.	September 30, 2007
Conduct an effectiveness review of the performance management program re-engineering effort	November 30, 2007

Management System: Integrated Planning
Management System Steward: J. Patrick Looney
Action Owner: Teresa Baker

2.0 Work Planning and Control Performance Improvement Initiatives

Problem Statement: The work planning and control process is not achieving the Laboratory's goals and objectives.

Almost a decade ago, the Laboratory implemented a formal process for Work Planning & Control. It has evolved and improved since then as we have gained experience with it, and have received valuable input from external assessments.
Two principal processes are used: 1) Work Planning, which applies to support work, and, 2) Experimental Safety Review, which covers the scientific work.

The Senior Management responsibility for Work Planning & Control rests with the Deputy Director for Operations who is the Management System Steward. Plant Engineering's Deputy Manager of Operations and Maintenance currently serves as the Management System Point of Contact. The Work Control Managers (WCMs) are the individuals responsible for the work planning & control processes in their organizational units and typically are experienced managers. Each designates one or more Work Control Coordinators (typically supervisors) to screen and/or plan the work of specific groups, or work done in a specific building or area.

BNL's work planning process uses a screening process to determine the required extent of work planning with the two ends of the spectrum being "skill of the worker" and a formal Work Permit.

The Experimental Safety Review (ESR) process ensures that SMEs review experiments, and hazards are assessed and mitigated. The needed level of review and approval for the experiments depends on the severity of the hazards and their consequences, as dictated by DOE Orders and ES&H Standards. The ESR establishes controls and operational limits for experiments.

The "Evaluation of ISM at BNL" and related assessments and feedback from the Work Control Managers revealed weaknesses in the Work Planning & Control Management System, each of which is addressed in the corrective actions below.

Furthermore, a causal analysis was performed to identify their underlying causes. The problem statement, supporting observation and causes identified through the causal analysis process are described below.

A. <u>Supporting Observations from Assessment Activities:</u>

1. The Laboratory Work Planning and Control processes allow a significant amount of work to be identified as "skill of the worker" without having adequate mechanisms to assure that individuals relied upon to make key decisions are competent

commensurate with their responsibilities. The present Laboratory process too easily allows WCCs and WCMs (screeners) to characterize the work as "skill of the worker". *[FY06 Evaluation of ISM at BNL]*

2. The training and qualifications process for work planning and control does not ensure that competence is commensurate with responsibilities. The work planning and control process relies heavily on the judgment, knowledge, skills and abilities of ES&H Coordinators, work control coordinators and work control managers. The level of knowledge and proficiency required for these positions is not sufficiently tested or validated. *[FY06 Evaluation of ISM at BNL]*
3. Management has not assured that adequate hazards analyses for "skill of the worker" activities have been performed and the results communicated to those workers performing the tasks. The Work Planning and Control (WP&C) subject area allows a requestor or work control coordinator to screen out the need for a work permit without first analyzing the hazards of the proposed scope, its complexity and the coordination required for execution. *[FY06 Evaluation of ISM at BNL] and [DOE Chicago ISMS Assessment, August 2004]*
4. Awareness and authorization of work activities by Building Managers is not formally required. Job supervisors are expected to communicate with appropriate personnel to ensure that the work will proceed safely and efficiently. *[Focused Management Review, August 2005].*

B. Causal Analysis Summary

The causal analysis for work planning and control was performed by a team of WCMs, facilitated by a senior safety professional from Battelle Memorial Institute's safety organization. The direct and root causes are presented below.

1. The operations section of the WP&C subject area contains logical flaws, is deficient, or in error in several of the following areas: (1) it does not provide sufficient and consistent requirements necessary to evaluate the nature of the hazards under consideration, (2) there is no guidance regarding the need to consider the interactions between hazards, and (3) it allows for a serial review of work permits rather than requiring a parallel review by required reviewers. *ORPS Cause Code: A5B2C08, Work planning and control guidance documentation does not provide clear or complete expectations and/or* requirements *[Direct Cause]*.
2. Employees have, in some cases, been assigned work planning and control positions without assuring their current knowledge, skills, and abilities are appropriate for the requirements of the position. *ORPS Cause Code: A4B2C09, Personnel selection (WCMs/WCCs) did not ensure match of worker motivations/job descriptions [Direct Cause]*
3. The primary mechanism used to communicate work planning and control training may not be sufficient, in and of itself, to ensure that all relevant information is being effectively conveyed and thoroughly retained. The training does not instruct or test the WCMs/WCCs on the following critical elements:
    - How to screen for "skill of the worker,"
    - How to prepare a Work Permit,
    - How to conduct a proper walk-down and job review,

- How to perform a Job Hazard Analysis,
- The proper conduct of a pre- and post-job brief.

ORPS Cause Codes: A6B3C02, The training material has inadequate content and A6B2C02; Testing is inadequate [Direct Cause]

4. There is no re-training program in place to maintain the proficiency of these positions – which is believed essential given the fundamental importance of the WCMs/WCCs position to the success of the work planning and control process. *ORPS Cause Code: A6B2C03, The refresher training is less than adequate.*
5. The resources committed to work planning and control, and the rigor associated with work planning and control implementation is often balanced against other priorities and resource demands. *ORPS Cause Codes: A4B1C01, the Laboratory has not universally established the priority and importance of ensuring excellence in the work planning and control process, A4B2C04*, *The level of resource commitment and priority accorded to safety-related training is not commensurate with its importance to achievement of effective safety management [Root Cause].*

C. Work Planning and Control Corrective Actions

Corrective Action WBS-2.1.1
Integrate Work Planning & Control into the Laboratory's Strategic Planning Process
As discussed above, among the actions planned to address the institutional level feedback and improvement weakness, is the development of Strategic Focus Areas (SFAs) that will become the framework for institutional management. The "Excellence in ESS&H" SFA will serve as the forum to communicate to all Laboratory managers the importance of, and institutional commitment to, excellence in the WP&C process as a key tool toward achieving overall ESS&H excellence.

- Assign a WP&C Representative to the ESSH SFA Team.
- Incorporate a strong commitment to work planning & control into the SFA goals and objective for the ESS&H SFA.

Management System:	Work Planning and Control
Responsible Manager:	M. Bebon
Corrective Action Owner:	C. Johnson
Target Completion Date:	August 15, 2006 ***[Completed]***
Addresses Supporting Observations:	N/A
Addresses Direct or Root Causes:	2.0- B5

Corrective Action WBS-2.1.2
Create a Culture of "All Work is Planned" and Develop Supporting Procedures and Methodologies
Over 80% of the work performed at BNL in the non-science areas is handled as "skill of the worker", as evidenced in a recent survey done in Facilities & Operations. In practice, there is an apparent bias toward informal work planning or the "skill of the worker" approach, rather than utilizing the more formal Work Permit process. In recognizing this bias, the Laboratory

has aggressively pursued OHSAS 18001 that features a Job Risk Assessment (JRA) and a Facility Risk Assessment (FRA) process with substantial worker involvement. These processes effectively introduce formal hazards analysis and mitigation to the routine tasks typically associated with SOW jobs. About 2/3 of the Laboratory's organizational units, including all of those using craft labor, have been registered. However, the Laboratory has not yet set expectations for integrating JRAs and FRAs into WP&C, nor how hazards and mitigation strategies are communicated to the workers. This corrective action will develop those expectations.

Another area needing improvement is the methodology for integrating multiple job-related hazards into the work planning process, particularly as it impacts "skill of the worker" in multi-craft jobs.

The following actions will reverse the bias toward SOW and drive a culture where all work is planned using a graded approach. The principal action here is developing methodologies to bridge the gap between "skill of the worker" and the Work Permit process. It will involve adding some formality to the present informal, undocumented work screening and planning processes that are used in many areas of BNL.

- Define and Implement a "Worker Planned Work" process (i.e. re-define and enhance skill of the worker determinations) that:
  - Clarifies when "Worker Planned Work processes" may be used in lieu of a formal work permit (i.e. work planning methodologies to bridge the gap between skill of the worker and the formal Work Permit.
  - Integrates hazard-analysis requirements into worker planned work determinations.
  - Includes a methodology for communicating hazards to workers for worker planned work jobs.
- Evaluate the quality of job risk assessments based on their impact on worker planned work and institutional risk. Revise/Update JRAs as appropriate.
- Develop a process to fully integrate JRAs and FRAs into the WP&C Process.
- Improve processes for hazard analysis and mitigation where there are multiple interacting hazards, e.g. multi-craft jobs.
- Integrate Lessons-Learned data into all Work Planning & Control processes.
- Develop requirements for considering multiple hazards and their interaction.

Management System:	Work Planning & Control
Responsible Manager:	M. Bebon
Corrective Action Owner:	C. Johnson/WCMs
Target Completion Date:	July 30, 2007 ***[Completed]***
Addresses Supporting Observations:	2.0- A1, A3
Addresses Direct or Root Causes:	2.0- B1

Corrective Action WBS-2.1.3
Clarify Building Manager Role in Work Planning & Control
In some of the Laboratory's organizations, though not in the majority, the same individual serves as Building Manager and WCM. The interface between these two key responsibilities has not been defined, and important guidance will be developed under this corrective action (CA).

- Evaluate the data collected from the pilot Building Manager work notification and use them to define the role of the Building Manager in Work Planning and Control, specifically, the required interaction between Building Manager and WCM.

Management System:	Work Planning & Control
Responsible Manager:	M. Bebon
Corrective Action Owner:	C. Johnson
Target Completion Date:	November 30, 2006 ***[Completed]***
Addresses Supporting Observations:	2.0- A4
Addresses Direct or Root Causes:	N/A

Corrective Action WBS-2.1.4
Address Gaps in ISM Flow down Processes for Subcontractors and Vendors
The Laboratory has worked hard at its construction-safety program for many years, including placing substantial and continuing focus on flow-down of ISM requirements to construction subcontractors. The process was reviewed in response to the recent fatalities at Savannah River and Hanford. That review and the "Evaluation of ISM at BNL" assessment validated the BNL's process for its subcontractors, but identified gaps in the area of labor obtained through small contracts, purchase orders, and other modalities that use the "web requisition" process. The actions below will address these concerns.

- Supplement existing ISM requirements flow-down procurement processes to include small contracts, service work, and warranty where the work will be performed on site.
- Modify the terms and conditions of contracts, purchase orders, and other procurement documents.
- Integrate into procedures the review and approval of web requisitions by WCMs and/or WCCs when work is to be performed onsite.

Management System:	Work Planning & Control
Responsible Manager:	M. Bebon
Corrective Action Owner:	C. Johnson
Target Completion Date:	October 30, 2006 ***[Completed]***
Addresses Supporting Observations:	2.0- A3
Addresses Direct or Root Causes:	N/A

Corrective Action WBS-2.1.5
Work Planning Processes for Job Change Control
Another problem raised in the feedback from the WCMs to the Management System Steward was that of changes to the work (after planning) not being called to the attention of the WCM or WCC. A related problem is "scope creep" wherein additional work that was not screened for hazards is added to the job without notification. This CA will address these issues.

- Develop procedures for addressing "scope creep" or changes in the work after the completing the initial work planning.
- Conduct workshops/training with Work Control Managers/Coordinators and workers to communicate the job change control process and institutional expectations.

Management System:	Work Planning & Control
Responsible Manager:	M. Bebon
Corrective Action Owner:	C. Johnson
Target Completion Date:	November 30, 2006 ***[Completed]***
Addresses Supporting Observations:	2.0- A3
Addresses Direct or Root Causes:	2.0- B1

Corrective Action WBS 2.1.6
Upgrade Work Planning and Control Management System Assessment Plan
This CA will focus primarily at the Management System Steward and Point of Contact level and upgrade the current assessment and reporting processes to keep pace with the evolution of the Laboratory's strategic planning process.

- Define risks and success factors for the WP&C Management System.
- Identify quantitative measures to track and report the management system's performance and incorporate such measures into quarterly reporting of the management system's status as part of Contractor and Corporate Assurance processes.
- Formalize the role of WCMs quarterly feedback session in management system assessment and improvement planning.
- Update the Work Planning & Control Assessment Tool.

Management System:	Work Planning & Control
Responsible Manager:	M. Bebon
Corrective Action Owner:	C. Johnson
Target Completion Date:	July 30, 2007 ***[Completed]***
Addresses Supporting Observations:	N/A
Addresses Direct or Root Causes:	2.0- B5

Corrective Action WBS-2.1.7
Integrate Human Performance Factors Principles into the Work Planning & Control Management System
Several of the Laboratory's Senior Managers were trained in the principles of Human Performance. Their reaction was very positive; they viewed these principles as being very powerful tools. This CA will develop a process to integrate these principles into the Laboratory's WP&C processes; a short-term and a longer term approach are being contemplated. The former approach is intended to achieve measurable results as rapidly as possible.

- Integrate the "Four Key Questions" into the process of Pre-Job Briefing.
- Develop an approach to include error precursors in the hazards analysis process.
- Develop and provide the Management System Steward with longer term recommendations for a more comprehensive integration process to the Management System Steward.

Management System:	Work Planning & Control
Responsible Manager:	M. Bebon
Corrective Action Owner:	C. Johnson
Target Completion Date:	July 30, 2007 ***[Completed]***
Addresses Supporting Observations:	2.0- A1
Addresses Direct or Root Causes:	N/A

Corrective Action WBS-2.2.1
Upgrade Work Control Manager and Coordinator Training & Qualifications
When BNL implemented its Work Planning and Control program in 1997, the institutional level program did not set specific requirements for training and qualifications of WCMs and WCCs. Since then, several organizational units have done so, but others have not. Since BNL relies heavily on the work planning & control process as part of implementing its ISM Program, and because these individuals are the key day-to-day decision-makers therein, it is considered a key aspect of "Competence Commensurate with Responsibilities" to set training and qualification-standards for these important roles. The action items under this CA will develop, and publish in SBMS, minimum Lab-wide training and qualification requirements for WCMs and WCCs.

- Review current training & qualifications requirements for WCMs and WCCs.
- Revise existing and add new requirements as appropriate.
- Develop a schedule for re-qualifying WCMs and WCCs through training and testing.

Management System:	Work Planning & Control
Responsible Manager:	M. Bebon
Corrective Action Owner:	C. Johnson
Target Completion Date:	July 30, 2007 ***[Completed]***
Addresses Supporting Observations:	2.0- A2

Addresses Direct or Root Causes: 2.0- B2

Corrective Action WBS-2.2.2
Revitalize the Training Program for Work Control Managers and Work Control Coordinators

The Work Planning & Control Management System Steward periodically meets with WCMs to discuss performance and solicit feedback. This feedback included dissatisfaction with the scope and quality of the training offered to WCMs and WCCs and the lack of a formal recurring training program. Several of the ISM reviews also questioned the lack of testing within the current training program. The actions under this CA will address all of these points.

- Develop a classroom training curriculum that offers scenario-based, or "case study" training.
- Add to or enhance the following elements of the training program
  - Screening Work
  - Preparing Work Permits
  - Performing Job Hazards Analyses/Evaluations
  - Conducting a Job Walk-down and Job Review
  - Conducting Pre and Post-Job Briefings
  - Soliciting Worker Feedback
- Upgrade the computer-based training to incorporate case studies.
- Institute learning validation through testing.
- Incorporate all applicable changes resulting from corrective actions in this plan in the revised WCM/WCC training/re-training as applicable.

Management System: Work Planning & Control
Responsible Manager: M. Bebon
Corrective Action Owner: C. Johnson/B. Schwaner
Target Completion Date: December 30, 2007
Addresses Supporting Observations: 2.0- A2
Addresses Direct or Root Causes: 2.0- B3, B4

Corrective Action WBS 2.3
Revise the Work Planning and Control Management System/Subject Area

The Work Planning and Control SBMS Documents will be revised to include new processes, improvements and updates to the institutions work control processes. Specific revisions/updates shall include the following:

- Define the "Worker Planned Work" methodology and/or processes;
- Describe the hazard analysis process, and how JRAs and FRAs are integrated into the WP&C process;
- Define job change control, and the Building Managers role in WP&C;
- Describe ISM Flowdown Processes for Subcontractors and Vendors; and
- Training and Qualification requirements for WCMs/WCCs.

- Revise the WP&C to ensure that clear, effective and functional connections are made between related management systems and processes (i.e. worker safety and health, facility safety, and occupational safety and health management systems), as applicable

Management System:	Work Planning & Control
Responsible Manager:	M. Bebon
Corrective Action Owner:	C. Johnson/S. Coleman
Target Completion Date:	September 15, 2007
Addresses Supporting Observations:	All
Addresses Direct or Root Causes:	All

3.0 Documentation Improvement Initiatives

Problem Statement: Some BNL-wide and internal controlled procedures are not current and in some cases do not provide adequate or complete instructions.

From 2004 – 2005, four internal assessments identified the need to strengthen institutional procedure controls in order to ensure that local procedures continue to meet minimum requirements delineated in corresponding SBMS Subject Areas. The Laboratory PAAA Committee reviewed these noncompliances, resulting in a NTS Noncompliance Report being filed on November 4, 2005 (NTS-CH-BH-BNL-BNL-2005-0001). A corrective action plan was developed to address these issues, details of the plan can be found in Section 6.6 of this Plan.

The "Evaluation of ISM at BNL" conducted in October 2005 found additional examples of weakness in documentation management, including several related to the SBMS Management System's Descriptions, Subject Areas, and Program Descriptions associated with the ISM program. Similar inconsistencies or dated conditions were observed in other operations documentation. Corrective actions included in this section were identified to address each specific weakness.

Additionally, the Laboratory's Senior Management conducted two separate causal analyses to identify the factors underlying the weaknesses. The supporting observations and causes identified through causal analyses are described below.

A. <u>Supporting Observations from Assessment Activities</u>

1. Critical ISM program documentation does not fully reflect current ESH&Q and Operations or ISM practices. The ISM Program Description is not current. The Integrated Assessment Program (IAP) Management System does not link to the Integrated Planning Management System and does not specify roles and responsibilities for Management System Stewards and/or Points of Contact (POC). The Assessment Planning & Evaluation Criteria Framework in the IAP management system description does not fully match the analogous framework in the IA Subject Area. *[FY06 Evaluation of ISM at BNL]*
2. Chapter IV of the Procurement Operations Manual (POM) "Construction Procurement" Revision 2 is written as if the Plant Engineering Division performs all construction activities. It does not; Plant Engineering uses a different construction inspection checklist than specified by the Construction Safety Subject Area. The

Construction Safety subject area (Section 1, step 2) cannot be performed as written. [*FY06 Evaluation of ISM at BNL]*
3. The WP&C Management System does not address the impact of the OHSAS processes. *[FY06 Evaluation of ISM at BNL]*
4. Labeling procedure for facility power distribution equipment and circuit breaker panel schedules is either not accurate or not up to date. *[FY06 Evaluation of ISM at BNL]*

B. <u>Causal Analysis Summary</u>

A team from across BNL conducted the first causal analysis process for this area, facilitated by a senior safety professional from Battelle Memorial Institute's VP/ESH&Q Office. The second one was led by the BNL DDO with managers from the ESH&Q directorate. Each analysis identified the direct and root causes presented below:

1. The Laboratory's requirements for periodically reviewing documentation at the institutional level and for reviewing local documentation have not been completely established and are not effectively communicated*. [Direct Cause]*
   NOTE: The corrective actions that address this cause are associated with the Procedures NTS Report and are described under Section 6.6 of this Plan.
2. The current management/reporting structure for Management System Stewards does not allow effective prioritization of requirements, or accountability for performance related to management system documentation and other responsibilities. *[Direct Cause]*
3. The support reorganization failed to effectively redistribute all responsibilities for document management throughout the new organizational structure. *[Direct Cause]*
4. Institutional roles, responsibilities, accountabilities and authorities (R2A2) documents for Level 1 managers do not always include all responsibilities assigned to them in SBMS. (Also, SBMS documents do not facilitate a grouping of responsibilities by position). *[Root Cause]*

C. <u>Documentation Corrective Actions</u>:

Corrective Action WBS-3.1.1
Evaluate Consolidation of ISM Related Management Systems; Upgrade Program Description

Evaluate the feasibility of combining the Occupational Safety and Health (OSH) (Pilot for OHSAS 18001) Program Description, OSH (Pilot for OHSAS 18001) Management System Description, Facility Safety Management System and Worker Safety and Health Management System Description into one Worker Safety and Health Management System. This assessment will use ISM as the basis to demonstrate how and where BNL applies the core functions and guiding principles to worker safety and health programs. The evaluation should include processes for keeping all ISM program documentation current, complete, and consistent with other SBMS documents.

- Complete management system consolidation evaluation and publish a revised Integrated Safety Management Program Description, Integrated Assessment Management system and new Worker Safety and Health Program Description as appropriate

- Designate a Steward and Point of Contact for the new management system.
- Develop and Implement a training/awareness presentation to actively communicate the significant changes resulting from consolidation, if applicable.

Management System:	Worker Safety & Health
Responsible Manager:	J. Tarpinian
Corrective Action Owner:	P. Williams
Target Completion Date:	January 30, 2007 ***[Completed]***
Addresses Supporting Observations:	3.0- A1
Addresses Direct or Root Causes:	N/A

Corrective Action WBS-3.1.2
Incorporate Annual ISM Documentation Review into Lab Planning & Assessment Calendar
As discussed under the Institutional Feedback and Improvement section, we will develop an annual Laboratory Planning & Assessment Calendar. The calendar will include the requirements for the annual ISM Declaration, and an annual review and update of all ISM documentation will be included in the calendar to ensure they are completed on time.

Management System:	Integrated Planning
Responsible Manager:	P. Looney
Corrective Action Owner:	S. Coleman
Target Completion Date:	September 30, 2006 ***[Completed]***
Addresses Supporting Observations:	3.0- A1
Addresses Direct or Root Causes:	3.0- B1

Corrective Action WBS-3.1.3
Correct Specific Procedure Deficiencies from "Evaluation of ISM at BNL"
Review the "Evaluation of ISM at BNL" Assessment Report identified many procedural and documentation deficiencies, which will be corrected:

- Review the "Evaluation of ISM at BNL" Report and capture all references to deficiencies in documentation/procedures.
- Notify the appropriate management system stewards to correct these deficiencies.
- Develop and Submit Notice of Intents (NOIs) to the SBMS office for incorporation of SBMS Document revision dates into the SBMS Completion Project (WBS 3.2.2)

Management System:	SBMS
Responsible Manager:	J. Tarpinian
Corrective Action Owner:	R. Lebel
Target Completion Date:	August 30, 2006 ***[Completed}***
Addresses Supporting Observations:	3.0- A2
Addresses Direct or Root Causes:	N/A

Corrective Action WBS-3.1.4
Realign Management System Steward Reporting Structure

Currently management system stewards report functionally to the DDO, under this arrangement, several of them report outside their line management structure. To increase accountability and ensure an appropriate balance between Management System Stewards and line priorities, the reporting relationship of the stewards will be revised. They will report to their line manager for their stewardship responsibilities, which will include the management-system's self assessment.
This change will also elevate the responsibility of several management systems since their stewards will then report to the Laboratory Director and the Deputy Director for Science.

- Revise appropriate SBMS documentation to reflect the new reporting relationship.
- Brief the Laboratory Director and Deputy Director for Science on their new responsibilities
- Deliver to the Human Resources Management System Steward/Point of Contact, additional R2A2 responsibilities of the:
  - Laboratory Director
  - Deputy Director for Operations;
  - Deputy Director for Science; and
  - Management System Stewards

Management System:	SBMS
Responsible Manager:	J. Tarpinian
Corrective Action Owner:	R. Lebel
Target Completion Date:	August 1, 2006 ***[Completed]***
Addresses Supporting Observations:	N/A
Addresses Direct or Root Causes:	3.0- B2, B3, B4

Corrective Action WBS-3.1.5
Roll-up Roles and Responsibilities to Management System Level; Include Management System Stewards and Points of Contact – Operations Group
The current SBMS guidelines do not require that roles and responsibilities embedded in subject areas, program descriptions or other SBMS documents are rolled up into the Roles and Responsibilities section of the Management System Description. This requirement will be instituted and all documentation reviewed to identify such roles and responsibilities, which then will then be captured at the management system level. A section will be added wherever the roles and responsibilities of the Management System Steward and Point of Contact are not explicitly stated in the description of the management system.

- Revise the guidelines for the SBMS documents by adding the requirement that all roles and responsibilities in any management system documents are summarized in the description of that system.
- In coordination with points of contact (POC) and Human Resources search SBMS documents to identify all such roles and responsibilities.
- Update the descriptions of the management system, where needed.
- Summarize the management system responsibilities by position.
- Deliver to the Human Resource Management System Steward/Point of Contact for incorporation of responsibilities in Management System Stewards and Point of Contact R2A2s.

Management System:	SBMS
Responsible Manager:	J. Tarpinian
Corrective Action Owner:	R. H. Lebel/J. Canestro
Target Completion Date:	June 1, 2007 ***[Completed]***
Addresses Supporting Observations:	N/A
Addresses Direct or Root Causes:	3.0- B3, B4

Corrective Action WBS-3.2.1
Complete Requirements Management Process Improvements
Each Management System Steward will review the Records of Decision (ROD) associated with their management systems and verify that the requirements set included in the management system is consistent with the compliance documents in the BSA contract and relevant best-practice commitments made by the Laboratory. Develop and implement electronic ROD process and complete contract mapping to management systems.

- Phase 1: Execute the process of Requirements Verification
  - Develop software tools to facilitate and document the verification of requirements.
  - Pilot (test) the verification process tools and prepare guidelines for the management system stewards.
  - Bin the management systems into phases based on their impact on institutional risk.
  - Train management system stewards in the requirements verification tools and processes.
- Phase 2: Test, Modify and Rollout Electronic ROD Tools
- Phase 3: Contract Mapping – This activity assures that all contract requirements and legal obligations are mapped to appropriate management systems.

Management System:	SBMS
Responsible Manager:	J. Tarpinian
Corrective Action Owner:	R. H. Lebel/J. Canestro
Target Completion Date:	August 15, 2008
Addresses Supporting Observations:	3.0- A1
Addresses Direct or Root Causes:	3.0- B1

Corrective Action WBS-3.2.2
R-Baseline and Finish the SBMS Completion Project
Verify current content of standard operating procedures, standard practice instructions, handbooks, and manuals that reside in SBMS. The scope of the SBMS Completion Project scope was defined as updating legacy documents on SBMS (standards, procedures and manuals) to conform to current requirements and practices or canceling them if they are no longer needed. This project started at the beginning of FY05 but all the documents had not been revised by the end of FY05. This corrective action re-establishes this project.

- Update the SBMS Completion Project's scope, responsibilities, and schedules.
- Secure the commitment of contributed and/or incremental resources.

- Implement the SBMS Completion Project in accordance with the approved plan (A completion date for finishing the SBMS project will be provided when the plan is finalized). ***Completed 12/30/06***
- Document revision histories and review dates for the legacy documents specified above.

Management System:	SBMS
Responsible Manager:	J. Tarpinian
Corrective Action Owner:	R. H. Lebel
Target Completion Date:	June 30, 2007 ***[Completed]***
Addresses Supporting Observations:	N/A
Addresses Direct or Root Causes:	N/A

4.0 Communications and Involvement Initiatives

Problem Statement: Communication and involvement processes do not always result in adequate understanding of, and response to, ESH&Q and operational issues and decisions.

BNL uses a wide range of communications methods and products to provide ES&H information to, and solicit feedback from, employees, visitors, guests, and students. Among the highest level ones are the Director's All-Hands meetings, Safety Focus Weeks, "the safety sign" at the entrance to the Laboratory, the weekly Brookhaven Bulletin, the biweekly Monday Memo, various institutional-level groups (Brookhaven Council, Director's Safety Committee), Quarterly Performance Reviews, and meetings of the three senior leadership councils (Policy, Science and Operations). In addition to these institutional level mechanisms, similar communication pathways exist within all of BNL's organizational units.

Despite these efforts, several external reviews and internal assessments found that BNL employees sometimes were not fully aware of the Laboratory's ES&H requirements, goals, and processes for ensuring excellence in ES&H. Also, employees do not always receive information on how well their work groups met safety goals and objectives, or on lessons-learned by other work groups (at BNL or at other laboratories) that might help improve their performance.

Some of these issues may be related to the need for senior management to visit the groups more often. Their increased presence in the work areas and at jobsites would facilitate communications with and among staff members on ES&H matters.

[NOTE: The initiative to increase managers' field observations is covered in section 7.3 "Safety Improvements Initiatives"].

Workers' involvement in ES&H processes has steadily improved over the last eight years, as work planning and control activity has expanded, and Worker Safety & Health Committees have been set up in many organizational units. However, the level of worker involvement is still highly variable across the Laboratory; the extent of employees' participation in work planning & control is less than desirable, particularly in formal feedback after completing jobs.

A key related issue is how BNL can effectively and efficiently communicate with visitors, guests, and students. All individuals working at BNL must know the Laboratory's ES&H requirements and obtain the knowledge needed to comply with them. Processes are in place, however based on recent experiences, their effectiveness needs further evaluation.

In addition, a causal analysis was performed to identify underlying causes of each specific weakness. The supporting observations and causes identified are described below:

A. <u>Supporting Observations from Assessment Activities:</u>

1. Information on the National Synchrotron Light Source (NSLS) electrical shock incident on the X1 beam line was not disseminated in a timely fashion to the Chairman or members of the Laboratory Electrical Safety Committee *[DOE Chicago ISMS Assessment, August 2004]*
2. Inconsistent Senior Management message concerning importance of safety. There is inadequate identification, flow down and application of requirements. *[DOE Chicago ISMS Assessment, August 2004]*
3. Experimental Safety Review (ESR) process is sound but scientific staffs do not demonstrate awareness of this work planning and control process. The effectiveness of the ESR process is undercut by the fact that science staffs typically do not communicate awareness that the ESR process and associated documentation are the definitive source of hazard control requirements (i.e. boundaries/guard against unreviewed experimental evolutions) for their work. *[FY06 Evaluation of ISM at BNL].*
4. The process for communicating and incorporating best practices/lessons learned information is largely informal and may not be providing full value to the Laboratory *[FY06 Evaluation of ISM at BNL].*

B. <u>Causal Analysis Summary</u>

1. Employees do not always understand the value of assigned actions and/or directives. The values of actions to the Laboratory and the underlying requirements or expectations are not always adequately explained. Some employees assume that they are expected to strictly comply without obtaining further understanding or clarification. *[ORPS Cause Codes A5B2C05 Communications Less than Adequate (LTA) - Ambiguous instructions / requirements; A5B2C02 Communications LTA – Difficult to implement; A4B1C03 Management Methods LTA – Management direction created insufficient awareness of impact of actions on safety / reliability; A4B5C11 Change Management LTA – Changes not adequately communicated] [Direct Cause].*
2. There is evidence that appropriate personnel are not being involved in certain safety related processes. Some workers state they have not been involved in work planning activities for evolutions in which they participated. Supervisors and workers have not always been involved in the conduct of causal analysis and subsequent development of corrective actions to address findings and weaknesses in their area of responsibility. *[ORPS Cause Codes: A4B5C05 Change Management LTA –*

System interactions not considered; A4B5C06 Change Management LTA – Personnel / department interactions not considered; A4B3C03 Work Organization and Planning LTA – Duties not well distributed among personnel] [Direct Cause].

3. The Laboratory has not established clear expectations for communication of safety-related information. Personnel are not universally aware of management's expectations regarding what safety-related information is to be communicated, under what circumstances, and with what "level of formality. *[ORPS Cause Codes. A5B1C01 Written Communications Method of Presentation LTA – Format deficiencies; A5B3C01 Written Communication Not Used – Lack of written communication; A4B1C01 Management Methods LTA – Management policy guidance / expectations not well-defined understood or enforced*] *[Direct Cause].*
4. The line management chain of command is not being universally used as the vehicle to convey safety expectations and priorities. The primary mechanism that is used to communicate safety expectations to some managers is via ES&H Coordinators and not necessarily from higher-level managers. *[ORPS Cause Codes. A4B1C01 Management Methods LTA – Management policy guidance / expectations not well-defined understood or enforced; A4B1C02 Management Methods LTA – Job performance standards not adequately defined; A5B3C01 Written Communication Not Used – Lack of written communication; and A4B4C01 Supervisory Methods LTA, Tasks and individual accountability not made clear to worker]. [Root Cause].*

C. Communication and Involvement Corrective Actions

The direct and root causes associated with this activity will be addressed by the corrective actions detailed in sections 1.0, Institutional Feedback and Improvement, 2.0, Work Planning and Control, and 3.0, Documentation. Table 1 shows the correlation of direct and root causes to corrective actions. The actions described below are focus on the proposals for communicating all implemented revisions and changes to documents, methodologies, and processes at BNL.

Corrective Action WBS-4.1.1
Communicate revisions and work Control Requirements
Conduct workshops/training sessions to communicate the Work Planning & Control expectations, Management System and subject area revisions/changes, and new methodologies to WCCs/WCMs, Building Managers, ES&H Coordinators and applicable staff.

Management System:	Work Planning and Control
Management System Steward:	M. Bebon
Action Owner:	C. Johnson
Target Completion Date:	January 30, 2007 ***[Completed]***
Addresses Supporting Observations:	N/A
Addresses Direct or Root Causes:	4.0-B1

Corrective Action WBS-4.1.2
ISM Operations Communications

Using a stakeholder team comprised of ES&H coordinators, safety professionals and ISM Division/Department points of contact will develop ISM general awareness/training to inform/help staff, visitors and guests understand how to perform work safely, and to clarify ISM activity/operation practices. The training/awareness material will be extended into a web-based course and linked to applicable JTAs.

Management System:	Integrated Assessment Program
Management System Steward:	J. Tarpinian
Action Owner:	S. Coleman
Target Completion Date:	August 30, 2006 ***[Completed]***
Addresses Supporting Observations:	4.0-A3
Addresses Direct or Root Causes:	4.0-B2

Corrective Action WBS-4.1.3
Operations Forum Evaluation/Implementation
Evaluate the need and/or establishment of an Operations Management Forum to analyze, evaluate, and inform Laboratory Management (Associate/Assistant Laboratory Directors (ALD), Department Chairs and Division Managers) of significant operational trends, including "recurring" events reportable to the Department of Energy Occurrence Reporting and Processing System (DOE ORPS) and the DOE Noncompliance Tracking System (NTS); suggest improvements, good practices, and lessons learned for wider application.

Management System:	Integrated Assessment Program
Management System Steward:	J. Tarpinian
Action Owner:	R. Lebel
Target Completion Date:	February 15, 2007 ***[Completed]***
Addresses Supporting Observations:	4.0-A2, A3
Addresses Direct or Root Causes:	4.0-B3, B4

Corrective Action WBS-4.1.4
Worker Safety & Health Rule (10CFR851) Workshops/Training Awareness
Communicate changes and requirements to appropriate Laboratory staff to ensure understanding of the new worker, safety and health rule. The changes and requirements established through the development of the Worker Safety and Health Program Description will be communicated through the SBMS subscription service and implementation workshops.

Management System:	Worker Safety and Health
Management System Steward:	J. Tarpinian
Action Owner:	S. Coleman
Target Completion Date:	February 28, 2007 ***[Completed]***
Addresses Supporting Observations:	4.0-A3
Addresses Direct or Root Causes:	4.0-B1

Corrective Action WBS-4.1.5
Barrier Analysis and Five Whys Causal Analyses Workshops

In support of the revised Event/Issues Management process, selected BNL Managers and Supervisors will be trained on causal analysis techniques (five whys, barrier analysis) required to ensure consistent classification, analysis and management of deficiencies to effective resolution.

Management System:	Quality Management
Management System Steward:	J. Tarpinian
Action Owner:	R. Lebel
Target Completion Date:	December 30, 2006 ***[Completed]***
Addresses Supporting Observations:	N/A
Addresses Direct or Root Causes:	N/A

Corrective Action WBS-4.1.6
Human Performance Strategy and Implementation Plan Development
In response to the Arc-Flash event at the Collider Accelerator Department (C-AD), BNL commissioned a Human Performance-Based accident investigation, which identified several observations in human performance characteristics used at BNL. In an effort to address those observations and support the human performance improvement, BNL will develop a site-wide human performance strategy and implementation plan [i.e., white paper for Laboratory Management consideration].

Management System:	Quality Management
Management System Steward:	J. Tarpinian
Action Owner:	R. Lebel
Target Completion Date:	March 30, 2007 ***[Completed]***
Addresses Supporting Observations:	N/A
Addresses Direct or Root Causes:	N/A

Table 1, Correlation of Direct and Root Causes, Key ISM Readiness Review Recommendations and Corrective Actions

Problem Area #1 – Feedback and Improvement, Corrective Action Management ORPS Cause Codes	Key Evaluation of ISM at BNL Final Report Recommendation(s) (Oct 2005)	Corrective Action Number(s)
1. Management Policy guidance/expectations not well defined, understood, or enforced [A4B1CO1] 2. Corrective Action for Previously identified problem or event was not adequate to prevent recurrence [A4B1C09]	**CF5-1A** – The Policy Council should adopt, set expectations, standards and outcomes for, and widely communicate a more aggressive commitment to institutionalized, prioritized and projectized ESH&Q and operations- related improvement initiatives. **CF5-1B** – To facilitate this endeavor, the Policy Council should seek to enhance and better integrate existing initiatives (Quarterly Performance Summary, management system stewardship, annual management reviews, contractor assurance, TIER I workshops) and create new initiatives (e.g. operations forum) to manage institutional ESH&Q and operations-related issues and risks. **CF5-1C –** BNL should re-evaluate (through benchmarking, internal and external customer surveys, and/or other mechanisms) its commitment to implementing a robust and credible Independent Oversight Program. **CF5-2 –** BNL should assure the establishment and implementation of an effective Contract Assurance Process as described in DOE Order 226.1.	**WBS-1.1 –** Adopt a strategy focused framework for Laboratory Wide planning, decision-making, and performance management. **WBS-1.2 –** Evolve institutional performance and risk analysis to improve feedback to institutional decision making and assurance processes. **WBS-1.3 –** Align resource allocation processes with the Laboratory's performance objectives. **WBS-1.4 –** Verify the sustainability and effectiveness of the performance-management processes
Problem Area #2 – Work Planning and Control ORPS Causes Codes		
1. Work planning and control guidance documentation does not provide clear or complete expectations and/or requirements [A5B2C08] 2. Personnel selection (WCMs/WCCs) did not ensure match of worker motivations/job descriptions [A4B2C09] 3. The training material has inadequate content [A6B3C02]	**EWP-2 –** Each "small science" department has unique work planning and control approaches and practices that, if coordinated and integrated, could result in more effective operations at lower cost. **AWP-1 –** The training of work control coordinators should be enhanced to ensure consistent and proper screening of work activities, and this training should include a performance-testing element. **OWP-1 –** The operations work planning and screening process should be modified to create the presumption that work requires job-specific planning (e.g. work permit or standard operating procedure) unless shown otherwise (in order to show a conservative posture)	**WBS-2.2.1 –** Upgrade Work Control Manager and Coordinator Training & Qualifications **WBS-2.1.1 –** Integrate Work Planning and Control into the Laboratory's Strategic Planning Process. **WBS-2.1.2 –** Create a culture of "All Work is Planned" along with supporting procedures and methodologies.

Problem Area #2 – Work Planning and Control ORPS Causes Codes (Cont'd)	**Key Evaluation of ISM at BNL Final Report Recommendation(s) (Oct 2005)**	**Corrective Action Number(s)**
4. Testing is inadequate [A6B2C02] 5. The refresher training is less than adequate [A6B2C02	**AWP-2 –** Job risk assessments (JRAs), Job training assessments (JTAs), qualification matrices, and equivalent hazard controls should be required for all work of equivalent risk regardless of whether that work is performed by a technician, tradesperson, engineer, subcontractor, visiting experimenter, or student. **AWP-3 –** A more proactive role for JRAs should be defined and incorporated into the work planning and control process. This is the most practical method to ensure that staffs understand the requirements. A more proactive JRA process will also alleviate the need for generating additional Standing Work Permits. **OWP-2 –** Training and proficiency requirements for key work planning positions should be identified. **OWP-3 –** A more proactive role for JRAs and FRAs in the work planning and control process should be defined and communicated.	**WBS-2.2.2 –** Revitalize the training program for work control managers and work control coordinators. **WBS-2.1.3**– Clarify the Building Manager Role in Work Planning and Control. **WBS-2.1.5 –** Work Planning Processes for Job Change Control. **WBS-2.1.6 –**Upgrade the Work Planning and Control Management System Assessment Plan**.** **WBS-2.1.7 –** Integrate human performance factors principles into the work planning and control management system
Problem Area #3 – Currency of Lab-Wide and Internal Controlled Procedures ORPS Cause Codes		
1. Written communication content less than adequate, incomplete/situation not covered [A5B2C08] 2. Written communication content less than adequate, ambiguous instructions/requirements [A5B2C05] 3. Corrective action for previously identified problem or event was not adequate to prevent recurrence [A4B1C09] *(This cause is addressed by corrective actions identified in problem statement #1)*	**CF5-4 –** All SBMS documentation essential to the ISMS Program should reflect current practices, expectations, and commitments. **RM-1 –** A resource-loaded project management plan to address the full scope of the identified Requirements Management/SBMS should be established, funded, and carefully managed. **IH-3 –** Specific actions should be established for the SBMS Office to publish identified revisions to IH subject areas. **COO-3 –** The conduct of operations conformance matrix for central plant operations should be updated. **RC-1** – The 10CFR835 Radiation Protection Plan scope statement should be revised to explicitly cover off-site radiological work.	**WBS-3.1.1 –** Consolidate ISM related Management Systems; Upgrade Program Description **WBS-3.1.2 –** Incorporate Annual ISM Documentation Review into Laboratory Planning & Assessment Calendar **WBS-3.1.3 –** Correct specific procedure deficiencies from the "Evaluation of ISM at BNL" **WBS-3.2.1 –** Complete the SBMS Requirements Verification **WBS-3.1.4–** Realign management system steward reporting structure **WBS-3.2.2** – Re-Baseline SBMS Completion Project **WBS-3.1.5 –** Roll-up Roles and Responsibilities to Management System Level

Problem Area #4 – Communication and Involvement ORPS Cause Codes	Key Evaluation of ISM at BNL Final Report Recommendation(s) (Oct 2005)	Corrective Action Number(s)
1. Management direction created insufficient awareness of impact of actions on safety / reliability [A4B1C03] 2. Communications less than adequate (LTA) – Ambiguous instructions / requirements [A5B2C05] 3. Communications LTA – Difficult to implement [A5B2C02] 4. Change management LTA – changes not adequately communicated [A4B5C11] 5. Change management LTA – System interactions not considered [A4B5C05] 6. Change management LTA – Personnel/department interactions not considered [A4B5C06] 7. Work Organization and Planning LTA – Duties not well distributed among personnel [A4B3C03] 8. Written Communication Not Used - Lack of Written Communication [A5B3C01]	**CF5-3 –** The Laboratory should establish and maintain all the conditions necessary for an effective program to evaluate and drive improvements in institutional ESH&Q and operations performance. These include: (1) clearly articulating Laboratory performance information needs, (2) establishing expectations, (3) empowering the line organizations and Management System Stewards to ensure delivery of required information needs, and (4) establishing a mechanism and process for evaluation and analysis at the institutional level. **EWP-1 –** Communications with scientific staff and visitors throughout the research directorates should reinforce the notion that they should keep the Experimental Safety Review (ESR) in the front of their mind as the definitive source of requirements and controls needed to be implemented and followed in order to understand the hazards in their work spaces and conduct their experimental activities safely. **AWP-4** – The Laboratory should encourage documentation of informal worker feedback, some of which can be very important. Sources of such informal feedback include: logbooks, toolbox meeting minutes, supervisors' personal notes, feedback from "skill of the worker" activities and JRA reviews, feedback from revised procedures or work plans, and pre and post-job briefings.	**WBS-1.1 –** Adopt a strategy Focused framework for Laboratory Wide planning, decision, and performance management. **WBS-1.2 –** Evolve institutional performance and risk analysis to improve feedback to institutional decision making and assurance processes. **WBS-1.3 –** Align resource allocation processes with Laboratory performance objectives. **WBS-1.4 –** Integrate Work Planning and Control into the Laboratory's Strategic Planning Process. WBS-2.1.2 – Create a culture of "All Work is Planned" AND Supporting procedures and methodologies**.** **WBS-2.1.3** – Clarify the Building Manager Role in Work Planning and Control. **WBS-2.1.5 –** Work Planning Processes for Job Change Control **WBS-2.1.6 –**Upgrade Work Planning and Control Management System Assessment Plan**.** **WBS-3.1.4 –** Realign management system steward reporting structure

5.0 Corrective Actions – Collider Accelerator Department Arc Flash Type B Incident

On Friday April 14, 2006, an electrical engineer restoring power by operating a 400 amp disconnect switch, after he had helped to trouble-shoot a problem in a power supply for one of the detectors of the Relativistic Heavy Ion Collider, was burned. The burns were caused by hot gasses and particles being ejected though seams in the disconnect switch and panel board, which remained intact, resulting from the rapid heating and over pressurization of the air caused by an arc flash that occurred within the 480V switch he was operating. The engineer received mostly first- and some second-degree burns across his head, forearms, and chest. The Laboratory Director ordered an immediate stand-down of electrical work above 440v, and a meeting with all Laboratory electrical workers to review the incident, the NFPA 70E requirements, and to solicit worker feedback. Several of the corrective actions in Section 5.1 below resulted from worker feedback at these sessions. An incident critique was held, and interim upgrades to personal protective equipment (PPE) were mandated Laboratory-wide.

A DOE Type B investigation was initiated following the incident. The team provided interim recommendations on Friday April 21st; Section 5.1 below describes the corrective actions that directly respond to them. In parallel with the Type B investigation, the Laboratory developed a set of actions to further assess the causal factors associated with the incident, and to revisit the effectiveness of existing plans, policies, and processes. The corrective actions from the Laboratory's response to this incident are included below in Section 5.2. Two of the principal ones are a review of human factors, and a comprehensive self-assessment of our electrical safety program.

On August 11, 2006, the DOE Type B Accident Investigation Board issued their final report. The board determined the accident resulted from a number of deficiencies in the implementation of a series of management systems and related processes. The team identified causal factors and 17 judgments of need (JON) for corrective actions to prevent recurrence. Based upon the investigation Board's recommended JON and Causal Factors, BNL developed a corrective action plan and forwarded the plan to DOE for review and approval.

In January 2007, a corrective action plan based on the investigations Board's recommended Judgments of Need (JON) and Causal Factors. The actions required to prevent a similar occurrence overlap, and in some cases extend beyond the DOE interim actions and preliminary actions items initially detailed in sections 5.1 and 5.2. Actions that overlap initial DOE and BNL recommended corrective actions, which have not been completed and duplicated in the approved plan, have been deleted from sections 5.1 and 5.2, and the DOE approved corrective action plan activities are detailed in section 5.3.

5.1 DOE Team Interim Recommendations

The interim recommendations of the Type B Team and the Laboratory's corrective actions are described below:

Corrective Action WBS-5.1.1
DOE Team Interim Recommendation #1:
With exception noted below, dress for Hazard Category 2 for 480V circuit breaker and switch operation (Exception – 480V panels where incident energy is sufficiently high that higher hazard category clothing is required or where operation is too dangerous to be performed manually)
Laboratory Response:
As of the receipt of this recommendation, the Laboratory had issued interim PPE requirements that met or exceeded the team's recommendation. They will remain in place until the following actions are completed].

- Review the NFPA 70E standards and determine the adequacy of the recommended personal protective equipment to protect workers to a level consistent with Laboratory safety goals, for all operations, including switching operations.
- If indicated, upgrade, the Laboratory Electrical Safety Standards to better address arc-flash personal protective equipment.
- Publish the upgraded standard in SBMS and/or local procedures, as appropriate

Management System:	Worker Safety
Management System Steward:	J. Tarpinian
Action Owner:	J. DiNicola (LESC Chair)
Target Completion Date:	September 30, 2006 ***[Completed]***

Corrective Action WBS-5.1.2
DOE Team Interim Recommendation #2:
Review the practice of racking circuit breakers with the bus energized or while inserting/removing Motor Control Center (MCC) starter buckets while the MCC is energized.
Laboratory Response:

- Review current procedures to evaluate whether the practice of racking circuit breakers into live bus should be continued and, if not, modify Laboratory Electrical Safety Standards to increase electrical safety *[completed on July 31, 2006]*.
- Benchmark practices for MCC bucket insertion/removal with other Laboratories and industrial sites *[completed on July 31, 2006]*.
- Benchmarking of practices identified a need to modify the SBMS Electrical Safety Standard 1.5.0 to include requirements for inserting/removing MCC starter buckets with the bus energized. The standard will be revised to include the following Laboratory Electrical Safety Committee (LESC) hazard controls:
    - An energized work permit shall be generated to validate that the task is necessary and that the proper PPE is used.
    - Arc-Flash analysis shall be performed to determine PPE requirements.
    - Arc –Flash incident energy must not exceed 40 cal/cm^2.

***Note: If these hazard control requirements can not be met then the equipment must be deenergized in order to rack a breaker or insert or remove an MCC bucket.**

- Train the Laboratory's electrical workers in the updated procedures (Electrical Safety Standard 1.5.0).

Management System:	Worker Safety
Management System Steward:	J. Tarpinian
Action Owner:	P. Williams
Target Completion Date:	December 30, 2006 ***[Completed]***

Corrective Action WBS-5.1.3
DOE Team Interim Recommendation #6:
Assure that PPE (Personal Protective Equipment) is worn properly.
Laboratory Response:

- Review current practices for using personal protective equipment
- Include the wearing of PPE as an item in upcoming negotiations with the IBEW

Management System:	Worker Safety
Management System Steward:	J. Tarpinian
Action Owner:	W. Hempfling
Target Completion Date:	September 30, 2006 ***[Completed]***

5.2 BNL Corrective Actions

In addition to implementing the interim recommendations of the DOE Type B team, the Laboratory identified several more actions that will be taken to further understand the causal factors in the event, and to ensure that they are corrected. The Laboratory's senior management wants to ensure that all aspects of our electrical safety program, including those without a direct role in the incident, are functioning as designed and are adequate to ensure safe operations once corrections are fully implemented. Based on this approach, the following is planned:

Corrective Action WBS-5.2.1
Human Performance-Based Accident Investigation
The Laboratory assembled a three-member accident investigation team of recognized subject matter experts (SMEs) in the field of human performance; one member is an expert consultant to the nuclear industry, another an INL SME, and a BNL SME. The team is charged with making thorough on-scene investigation to identify the (non-technical) direct and root causes for the incident, and the organizational weaknesses that led to the actions of the personnel involved. The investigation is scheduled to start May 8th.

Management System:	Worker Safety
Management System Steward:	J. Tarpinian
Action Owner:	M. Bebon

Target Completion Date: May 31, 2006 ***[Completed]***

Corrective Action WBS-5.2.2
Electrical Safety Self Assessment
As part of its Integrated Assessment program for the remainder of CY06, the Laboratory will hold a comprehensive electrical program self-assessment using a combination of reviews by management system stewards and line organizations as part of their annual self assessments, evaluations by the Laboratory's Internal Audit/Independent Oversight Office, and external reviews (include in FY 07 Self-Assessment Planning (completed in the 1st Qtr FY 07). Further corrective actions likely will result from these reviews. The reviews' scope will include the following areas:

- Engineering design
- Procurement
- Installation and testing
- Maintenance (including 480V breakers, switches, and programmatic equipment)
- Management of deferred maintenance risk
- Effectiveness of electrical workers' training and qualifications
- Institutional electrical-safety support and oversight
- Lessons learned

Management System: Integrated Assessment
Management System Steward: J. Tarpinian
Action Owner: P. Williams
Target Completion Date: September 30, 2007 ***[In progress]***

Corrective Action WBS-5.2.3
Electrical Safety Self Assessment - Corrective Action Effectiveness Review
The Laboratory will perform an effectiveness review of corrective actions previously implemented in conjunction with our NFPA 70E electrical safety self assessment.

Management System: Integrated Assessment
Management System Steward: J. Tarpinian
Action Owner: R. McNair
Target Completion Date: September 30, 2006 ***[Completed]***

Corrective Action WBS-5.2.4
Lessons Learned / Best Practices Review
The Laboratory will evaluate the DOE's ORPS- and lessons learned-databases concerning all previous electrical events to identify lessons learned. In addition, a search will be made for electrical safety "best practices" within the DOE complex. The results of this evaluation/search will be presented to the ALD for ESH&Q, the Safety and Health Services Manager, and the Laboratory's Electrical Safety Committee for them to assess the applicability to BNL.

Management System: Integrated Assessment
Management System Steward: J. Tarpinian
Action Owner: E. Sierra
Target Completion Date: September 1, 2006 ***[Completed]***

5.3 BNL Arc Flash Corrective Action Plan Activities Approved by DOE

This section details the corrective actions specified in the corrective action plan approved by DOE. Actions in this section have been incorporated into BNL's Institutional Assessment Tracking System (ATS); and will be tracked through closure under ATS# 3474. DOE-BHSO has requested that they review and approve each corrective action before closure. BNL will notify DOE-BHSO for participation in the verification of completion of actions. BNL will prepare a closure package for each corrective action and document the specific actions taken to address the applicable ATS action item. Below is a list of corrective actions required to minimize the risk of recurrence.

Corrective Action ATS 3474.9.3

Action Title: Protect Collider Accelerator Department (C-AD) staff from the arc-flash hazard

Action Description: Require all C-AD to attend a briefing on the STAR arc flash event. Review NFPA 70E PPE requirements. Train supervisors, electrical workers and staff on new PPE requirements, disconnect switches and using receptacles.

Action Owner: J. Sandberg

Due Date: July 25, 2006 ***[Completed]***

Corrective Action ATS 3474.12.2

Action Title: Survey report of Balance of Plant (BOP) Switches

Action Description: Survey report of BOP switches that identifies GE Spectra Series switches.

Action Owner: A. Somma

Due Date: August 30, 2006 ***[Completed]***

Corrective Action ATS 3474.16.5

Action Title: Develop a manager observation program

Action Description: Develop a manager observation program, disciplinary action for safety infractions, and comprehensive, up-to-date safety rules for managers and supervisors to ensure all rules, including stop work and wearing PPE properly are followed.

Action Owner: E. Lessard

Due Date: October 1, 2006 ***[Completed]***

Corrective Action ATS 3474.9.1

Action Title: Review Safety Assessment Document (SAD) and make a list of controls

Action Description: Review SAD and create a list of all engineered controls and administrative controls related to safety and health.
Action Owner: E. Lessard
Due Date: October 17, 2006 ***[Completed]***

Corrective Action ATS 3474.9.2
Action Title: Prioritize list of controls for safety and health
Action Description: Prioritize the list of all engineered controls and administrative controls related to safety and health.
Action Owner: E. Lessard
Due Date: October 17, 2006 ***[Completed]***

Corrective Action ATS 3474.2.1
Action Title: Evaluate installing damping resistors
Action Description: Evaluate installing damping resistors in BNL electrical distribution systems.
Action Owner: J. Sandberg
Due Date: October 27, 2006 ***[Completed]***

Corrective Action ATS 3474.14.1
Action Title: Complete a formalized management plan
Action Description: Complete a formalized management plan for incident energy calculations.
Action Owner: S. Mukherji
Due Date: November 2, 2006 ***[Completed]***

Corrective Action ATS 3474.15.1
Action Title: Complete report on independent review results.
Action Description: Complete a report documenting the independent-effectiveness review results of implementation of PPE and training requirements of NFPA 70E
Action Owner: R. McNair
Due Date: November 10, 2006 ***[Completed]***

Corrective Action ATS3474.5.1
Action Title: Completion of remote monitoring installation for C-AD.
Action Description: Complete installation of remote monitoring of ungrounded systems.
Action Owner: J. Sandberg
Due Date: November 15, 2006 ***[Completed]***

Corrective Action ATS 3474.10.1
Action Title: Develop Laboratory Electrical Safety Committee Policy
Action Description: Electrical safety committee policy/practice that formalizes the actions to be taken when a ground fault is annunciated.
Action Owner: J. DiNicola
Due Date: November 15, 2006 ***[Completed]***

Corrective Action ATS 3474.11.1
Action Title: Need guidance for actions prior to starting work
Action Description: Guidance that determines what approvals and actions to take prior to starting work.
Action Owner: J. DiNicola
Due Date: November 15, 2006 ***[Completed]***

Corrective Action ATS 3474.12.3
Action Title: Inspection report of switches ensuring integrity
Action Description: Inspection report of all BOP GE Spectra Series switches that ensure mechanical integrity; mitigate hazards as necessary until switches can be repaired or replaced.
Action Owner: A. Somma
Due Date: November 30, 2006 ***[Completed]***

Corrective Action ATS 3474.11.2
Action Title: Develop a procedure, train workers and implement procedure for C-AD workers.
Action Description: Develop a procedure that establishes actions for safe work on ungrounded delta electrical systems that have a ground fault, and train workers on new/revised procedure(s).
Action Owner: J. Sandberg
Due Date: November 30, 2006 ***[Completed]***

Corrective Action ATS 3474.11.3
Action Title: Develop a procedure, train workers and implement procedure for BOP workers.
Action Description: Develop a procedure that establishes actions for safe work on ungrounded delta electrical systems that have a ground fault, and train workers on new/revised procedure(s).
Action Owner: A. Warren
Due Date: November 30, 2006 ***[Completed]***

Corrective Action ATS 3474.10.2
Action Title: Develop a EP Procedure – Ground Fault Annunciated
Action Description: Develop a Plant Engineering procedure to address receipt of initial ground fault alarms.
Action Owner: A. Warren
Due Date: November 30, 2006 ***[Completed]***

Corrective Action ATS 3474.9.5
Action Title: Revise the Operating Manual – Re-power to STAR magnets
Action Description: Revise the OPM, which specified how to turn on and off power to the STAR magnets before RHIC startup to be consistent with the new breaker panel configuration and the new method to remotely open the supply breaker.
Action Owner: J. Sandberg
Due Date: December 1, 2006 ***[Completed]***

Corrective Action ATS 3474.9.6
Action Title: Write an OPM before RHIC Startup
Action Description: Write an OPM before RHIC startup that specifies steps to take when a ground fault is detected on a transformer at C-AD.
Action Owner: J. Sandberg
Due Date: December 1, 2006 ***[Completed]***

Corrective Action ATS 3474.3.1
Action Title: Set all C-AD ground fault relays for optimum sensitivity.
Action Description: All C-AD ground fault relays set for optimum sensitivity,
Action Owner: J. Sandberg
Due Date: December 1, 2006 ***[Completed]***

Corrective Action ATS 3474.9.7
Action Title: Report purpose/method/outcome of review, arc flash hazard
Action Description: Report purpose, method and outcome of the review for the First Priority Item, arc flash hazard, to ensure all equipment necessary for safe and reliable operation of the RHIC meets design specifications and national standards for arc-flash protection. Include appropriate records with the report to support the declaration that all equipment necessary for safe and reliable operations of the RHIC has been verified against requirements (e.g., SME reports, PPE training records, procedures and corrective action reports).
Action Owner: E. Lessard

Due Date: December 1, 2006 ***[Completed]***

Corrective Action ATS 3474.16.3
Action Title: Examine jobs at C-AD/revise policies
Action Description: Examine jobs at C-AD to see if they warrant the application of continuous-use' procedure concept, which requires step-by-step sign-off. Look at C-AD policies for procedures (OPM 1.4 series) and revise so that they address management expectations for using checklists and provide instruction for completing checklists with and without step-by-step sign-off.
Action Owner: R. Karol
Due Date: December 1, 2006 ***[Completed]***

Corrective Action ATS 3474.12.1
Action Title: Prepare inspection report of all Spectra switches
Action Description: Inspection report of all C-AD GE Spectra Series switches that evaluates mechanical integrity, repairs or replacement of switches.
Action Owner: J. Sandberg
Due Date: December 1, 2006 ***[Completed]***

Corrective Action ATS 3474.9.4
Action Title: Inspect all GE Spectra switches
Action Description: Inspect all GE Spectra switches and ensure they are safe for opening or closing, or replace with new switches before RHIC start-up.
Action Owner: J. Sandberg
Due Date: December 1, 2006 ***[Completed]***

Corrective Action ATS 3474.16.1
Action Title: Perform retraining on requirements in OPM 2.28i
Action Description: Perform retraining of work control coordinators and workers on the requirements in OPM 2.28.i, Conducting Effective Pre-Job Briefings, Walk-Downs and Post-Job Reviews. Observe pre-job briefings, walk-downs and post-job reviews and document observations.
Action Owner: P. Cirnigliaro
Due Date: December 1, 2006 ***[Completed]***

Corrective Action ATS 3474.17.1
Action Title: Issue Lessons learned report
Action Description: Lessons Learned report issued and submitted to the DOE LL Database.

Action Owner: E. Sierra
Due Date: December 15, 2006 ***[Completed]***

Corrective Action ATS 3474.16.4
Action Title: Examine and trend operating performance of equipment
Action Description: Examine and trend operating performance of all experimental equipment serviced by CAS technicians and use the C-AD Availability Reporting System.
Action Owner: P. Ingrassia
Due Date: December 30, 2006 ***[Completed]***

Corrective Action ATS 3474.14.4
Action Title: Establish formal process for new system installation
Action Description: For new system installations, establish a formal process for documenting changes, performing calculations and labeling associated breakers and switches and add to Standards Based Management System.
Action Owner: J. Durnan
Due Date: December 30, 2006 ***[Completed]***

Corrective Action ATS 3474.16.2
Action Title: Develop formal procedures to go with critical checklists
Action Description: For checklists used by C-AD electrical engineering groups, develop formal procedures to go with the critical checklists. For example, the checklist for routine substation monitoring needs a procedure. Look at all electrical jobs and develop new procedures and checklists wherever warranted.
Action Owner: R. Karol
Due Date: December 31, 2006 ***[Completed]***

Corrective Action ATS 3474.6.1
Action Title: Create report - describe the results of the safety approvals
Action Description: A report that describes the results of the safety approvals concerning the substations in question and identifies corrective actions.
Action Owner: A report that describes the causal analysis and develops corrective actions for failure of the design review and approval process for the RHIC substation.
Due Date: December 31, 2006 ***[Completed]***

Corrective Action ATS 3474.6.2
Action Title: Create report - describe the results of the safety approvals
Action Description: A report that describes the results of the safety approvals concerning the substations in question and identifies corrective actions.

Action Owner: J. Tarpinian
Due Date: December 31, 2006 ***[Completed]***

Corrective Action ATS 3474.7.1
Action Title: Assessment report and C/A Plan - MS report complete
Action Description: Assessment Report and Corrective Action Plan identifying the gaps in the engineering design and design review processes, the corrective actions to be taken to improve the engineering design and design review processes, including scope, schedule and responsibility for each corrective action.
Action Owner: R. Costa
Due Date: January 30, 2007 ***[Completed]***

Corrective Action ATS 3474.8.1
Action Title: Acceptance Testing - MS Assess Rev & Report complete
Action Description: Acceptance Testing - Management System Assessment Review & Report Complete.
Action Owner: J. Tarpinian
Due Date: January 30, 2007 ***[Completed]***

Corrective Action ATS 3474.8.7
Action Title: Operational Readiness Review – MS Report Complete
Action Description: Operational Readiness Review - Management System Assessment Review & Report Complete.
Action Owner: J. Tarpinian
Due Date: January 30, 2007 ***[Completed]***

Corrective Action ATS 3474.8.4
Action Title: Commissioning - MS Asst Rev & Report complete
Action Description: Commissioning - Management System Assessment Review & Report on Commissioning Complete.
Action Owner: A. McNerney
Due Date: February 28, 2007 ***[Completed]***

Corrective Action ATS 3474.18.1
Action Title: Create report documenting approval of mod Kirk Key interlock
Action Description: Report documenting the approval of installations modified for Kirk Key interlocks prior to August 2005.
Action Owner: J. Durnan
Due Date: February 28, 2007 ***[Completed]***

Corrective Action ATS 3474.16.8
Action Title: Prepare report on Conduct of Ops Program implementation
Action Description: Report that evaluates the implementation of the Conduct of Operations Program with emphasis on procedural adherence, formality of operations, performance of required job briefings, and the exercise of stop-work.
Action Owner: R. McNair
Due Date: March 6, 2006 ***[Completed]***

Corrective Action ATS 3474.7.2
Action Title: Assessment report and C/A Plan - Maturity Report complete
Action Description: Assessment Report and Corrective Action Plan identifying the gaps in the engineering design and design review processes, the corrective actions to be taken to improve the engineering design and design review processes, including scope, schedule and responsibility for each corrective action.
Action Owner: R. Costa
Due Date: March 31, 2007 ***[Completed]***

Corrective Action ATS 3474.8.2
Action Title: Acceptance Testing – Maturity Determination Procurement & Report complete
Action Description: Acceptance Testing - Maturity Determination Process & Report Complete.
Action Owner: J. Durnan
Due Date: March 31, 2007 ***[Completed]***

Corrective Action ATS 3474.3.2
Action Title: Set all BOP ground fault relays for optimum sensitivity.
Action Description: All BOP ground fault relays set for optimum sensitivity.
Action Owner: S. Mukherji
Due Date: April 30, 2007 ***[Completed]***

Corrective Action ATS 3474.8.3
Action Title: Acceptance Testing - Corrective action plan
Action Description: Acceptance Testing - Corrective Action Plan Complete.
Action Owner: J. Tarpinian
Due Date: April 30, 2007 ***[Completed]***

Corrective Action ATS 3474.8.5

Action Title: Commissioning – Maturity Determination Proc & Rep
Action Description: Commissioning - Maturity Determination Process & Report Complete.
Action Owner: A. McNerney
Due Date: April 30, 2007 ***[Completed]***

Corrective Action ATS 3474.8.8
Action Title: Operational Readiness Review – Maturity Determination Report
Action Description: Operational Readiness Review - Maturity Determination Process & Report Complete.
Action Owner: J. Tarpinian
Due Date: May 31, 2007 ***[Completed]***

Corrective Action ATS 3474.5.2
Action Title: Completion of remote monitoring installation for BOP
Action Description: Completion of remote monitoring installation for BOP
Action Owner: S. Mukherji
Due Date: October 31, 2007

Corrective Action ATS 3474.13.1
Action Title: Upgrade Preventive maintenance program
Action Description: Upgrade preventative maintenance program to meet requirements of NFPA 70B.
Action Owner: C. Johnson
Due Date: September 30, 2007

Corrective Action ATS3474.9.8
Action Title: Report purpose/method/outcome of 2nd & 3rd priority items
Action Description: Report purpose, method and outcome of the review for Second and Third Priority Items to ensure all equipment necessary for safe and reliable operations of the RHIC meets design specifications and national standards. Include appropriate records with the report to support the declaration that all equipment necessary for safe and reliable operations of the RHIC has been verified against requirements (e.g., SME reports, PPE training records, procedures, corrective action reports).
Action Owner: E. Lessard
Due Date: June 30, 2007 ***[Completed]***

Corrective Action ATS 3474.8.9
Action Title: Operational Readiness Review - Corrective Action Plan Complete

Action Description: Operational Readiness Review - Corrective Action Plan Complete
Action Owner: J. Tarpinian
Due Date: June 30, 2007 ***[Completed]***

Corrective Action ATS 3474.7.3
Action Title: Assessment report and C/A Plan - C/A Plan
Action Description: Assessment Report and Corrective Action Plan identifying the gaps in the engineering design and design review processes, the corrective actions to be taken to improve the engineering design and design review processes, including scope, schedule and responsibility for each corrective action.
Action Owner: R. Costa
Due Date: June 30, 2007 ***[Completed]***

Corrective Action ATS 3474.8.6
Action Title: Commissioning - Corrective action plan complete
Action Description: Commissioning - Corrective Action Plan Complete
Action Owner: A. McNerney
Due Date: June 30, 2007 ***[Completed]***

Corrective Action ATS 3474.4.1
Action Title: Evaluate the performance of surge suppressors
Action Description: Evaluation of the performance of surge suppressors
Action Owner: J. Sandberg
Due Date: July 15, 2007 ***[Completed]***

Corrective Action ATS 3474.2.2
Action Title: Complete installation of damping resistors for C-AD and BOP
Action Description: Complete installation of damping resistors for C-AD and BOP.
Action Owner: J. Sandberg
Due Date: October 31, 2007

Corrective Action ATS 3474.1.1
Action Title: Optimize circuit breaker trip settings for high incident
Action Description: Optimize circuit breaker trip settings for high incident energy power systems.
Action Owner: J. Sandberg
Due Date: September 30, 2007

Corrective Action ATS 3474.14.2

Action Title: Complete calculations/label high energy systems
Action Description: Complete calculations and label high-energy systems for C-AD and BOP.
Action Owner: S. Mukherji
Due Date: September 30, 2007

Corrective Action ATS 3474.16.7
Action Title: Ensure records retention practices are effective
Action Description: Review C-AD Groups and Divisions and correct problems to ensure records retention practices outlined in OPMs 13.4.1, 13.4.2, 13.4.2.a, 13.4.2.b and 13.4.2.c are effective.
Action Owner: D. Passarello
Due Date: October 15, 2007

Corrective Action ATS 3474.16.6
Action Title: Ensure procedures contain instructions - abnormal conditions
Action Description: If C-AD will examine its procedures and correct problems to ensure procedures contain instructions for notifications under abnormal conditions and personal protective equipment requirements where applicable. This will occur during the normal procedure review cycle. However, C-AD will scan for procedures that use electrical safety PPE and update them within the first 18 months. Until then we will rely on existing procedures, work planning, training, conservative levels of PPE for electrical work and weekly safety meetings to cover this issue.
Action Owner: D. Passarello
Due Date: April 15, 2008

Corrective Action ATS 3474.1.2
Action Title: Optimize circuit breaker trip settings remaining power
Action Description: Optimize circuit breaker trip settings for remaining power systems
Action Owner: J. Sandberg
Due Date: September 30, 2008

Corrective Action ATS 3474.14.3
Action Title: Complete calculations/label remaining systems
Action Description: Complete calculations and label remaining systems for C-AD and BOP.
Action Owner: S. Mukherji
Due Date: December 30, 2008

6.0 Ongoing Action Plans Tracking/Follow Up

The successful implementation of the worker safety and health rule is tied to the implementation and effectiveness of the Laboratory's existing safety and health program. Recent assessments of this identified that implementation is inconsistent with the management system's requirements. Accordingly, BNL developed and implemented the following corrective-action plans to resolve problems in the safety and health program and improve it:

1. DOE Office of Science Occupational Safety and Health Administration (OSHA) Assessment Corrective Action Plan
2. Material Handling/Hoisting and Rigging Action Plan
3. Industrial Hygiene Assessment Action Plan
4. Energized Electrical Work Review (NFPA 70E) Improvement Plan
5. Authority Having Jurisdiction (AHJ) National Recognized Testing Laboratory (NRTL) Action Plan
6. Inadequate Control of Procedures Action Plan

The Safety and Health Services Division Manager will be responsible for monitoring the overall progress in implementing the actions for the first five corrective action plans and for reporting progress to the Environment, Safety, Health and Quality Assistant Laboratory Director. The Manager of the Quality Management Office will likewise deal with the sixth action plan on Inadequate Control of Procedures.

6.1 DOE Office of Science Occupational Safety and Health Administration (OSHA) Assessment Corrective Action Plan

DOE conducted an on-site, OSHA "wall-to-wall" assessment of BNL from October 21-November 19, 2003, at the direction of Congress to determine the cost of transitioning the DOE laboratories to external regulation (OSHA and NRC). The final list submitted to BNL included 2,530 citations with 5,503 findings. Of those findings, 154 were recommendations and 700 (RHIC vacuum breakers) were removed with the DOE's concurrence leaving an "official" 4,649 findings to be addressed. The DOE subsequently gave directions to the National Laboratories to correct identified deficiencies within two years.

A corrective-action plan was developed to address the findings from this 2003 OSHA audit. This was closed out in February 2006, as planned.

6.2 Material Handling/Hoisting and Rigging (H&R) Action Plan

On March 24, 2004, the coordinators of BNL's Occurrence Reporting Processing System (ORPS) declared a Significance Category "R" Occurrence based on recurring problems with material handling. In particular, the following (previously reported to ORPS) events underlay that judgment:

1. 08/12/03, Forklift Load Strikes Overhead Lines, Off-Normal, (CH-BH-BNL-BNL-2003-0013)
2. 09/04/03, Lifting Magnet Device Releases Steel Plate, Off-Normal, (CH-BH-BNL-BNL-2003-0018)
3. 12/30/03, Transformer Dropped During Rigging, Significance Category 3, (CH-BH-BNL-AGS-2003-0001)
4. 03/05/04, Load Falls Off Flatbed Truck During Transport, Significance Category 3, (CH-BH-BNL-AGS-2004-0002)

NTS-CH-BH-BNL-BNL-2004-0002, "Recurring Material Handling Problems," was issued on June 18, 2004. This report addresses a series of four recurring material handling problems reported in NTS as a "Programmatic Deficiency" involving "Repetitive or Recurring" noncompliance. The NTS has a total of 50 corrective actions (ATS 1948); 45 were closed. All corrective actions are expected to be completed by June 30, 2007. An Internal Audit and Oversight (IA&O) assessment to validate the effectiveness of corrective actions was completed during the first quarter of FY06. The results indicate a clear commitment by management to improving material handling at BNL, and significant progress and improvement were noted in developing and implementing the Laboratory's Hoisting & Rigging (H&R) Training and Qualification program and in procuring H&R equipment. The areas of Operations and Equipment Inspection have improved in general, but specific areas require additional attention. Continued attention from management is needed to ensure that further actions to address deficiencies reported in the IA&O effectiveness review are specified and tracked to completion in the Assessment Tracking System (ATS 3078).

Open Corrective Action Activities

- **ATS 1948.2.1**

Action Owner: M. Healey
Action Title: Documented Initial Receipt Inspection of Equipment Not Being Performed
Action Description: Documented initial receipt inspection of equipment is not being performed. Although this inspection is NOT required by DOE-STD-1090-2004, BNL will work toward ensuring the requirements are met for all purchased equipment.
Due Date: June 30, 2006 ***[Completed]***

- **ATS 1948.4.1**

Action Owner: P. Williams
Action Title: Hazard Analysis for Skill of the Craft
Action Description: Hazards analyses for skill-of-the-craft activities will be addressed with the implementation of OHSAS 18001 registration. Registration under OHSAS 18001 requires risk assessment of routine/skill-of-the-craft activities as well as non-routine work. BNL's process is to have a team, including workers, ESH professionals and supervisors, conduct the job-risk assessment (JRA).

Due Date: December 30, 2006 ***[Completed]***

- **ATS 1948.1.11**

Action Owner: B. Schwaner
Action Title: Crane Operators Not Required to be Individually Qualified
Action Description: Crane Operators are not required to be individually qualified on each crane they operate. Incidental Crane Operators and Forklift Operators Crane operators will be qualified for the class of crane they operate. The training program is being updated to include and record equipment and task specific skills training and evaluation.
Due Date: December 30, 2006 ***[Completed]***

- **ATS 1948.14.1**

Action Owner: J. Tarpinian
Action Title: Assess the Effectiveness of Material Handling Corrective Actions
Action Description: Assess the effectiveness of corrective actions that are related to the root causes of deficiencies in material handling.
Due Date: June 30, 2007 ***[Completed]***

- **ATS 3078.2.1, 2.2 and 2.4**

Action Owner: T. Lambertson
Action Title: Conduct Toolbox Meetings with Forklift and Crane Operators
Action Description: Provide follow-up instructions to forklift operators to ensure adequate pre-use inspections are performed. Tool box meetings shall include communicating that forklift and cranes cannot be used if their inspections are expired or tags are illegible.
Due Date: September 30, 2006 ***[Completed]***

- **ATS 3078.2.7**

Action Owner: T. Lambertson
Action Title: Develop a Facility Configuration Management Plan
Action Description: Develop a facility configuration management plan and execute with available resources. The plan will include, as a minimum, location of equipment to provide safe operation with in the facility and equipment to be excessed.
Due Date: September 30, 2006 ***[Completed]***

6.3 Industrial Hygiene Assessment Action Plan

The DOE Brookhaven Site Office (BHSO) conducted a site wide assessment of the Laboratory's industrial hygiene exposure assessment programs and processes during the period from June 6 through June 10, 2005. It focused on how effectively the industrial-hygiene

function, specifically exposure assessment and monitoring, is integrated into work planning and hazard control. Emphasis was placed on the following activities and hazards: experimental use of hazardous chemicals, construction, decontamination and demolition work, welding, cutting and brazing, and vehicle maintenance. The assessment looked at routine and non-routine work activities that potentially might expose workers to regulated chemicals and other non-radiological occupational health hazards. The assessment involved document reviews, facility walkthroughs, and interviews of workers, work control coordinators, researchers, and other professional staff. Although no situations were discovered that indicated workers are subject to unprotected overexposure to hazardous substances, the assessment team documented their concerns about the lack of institutional requirements to drive monitoring- and assessment-activities. Initial assessments of baseline exposure based on personnel sampling for various routine occupational health hazards are lagging. In addition, routine personnel monitoring of occupational health hazards, such as noise and welding fumes are not consistent with regulatory requirements. The BHSO concluded that the current structure for delivering IH exposure-monitoring services and conducting credible exposure assessments is largely responsible for these concerns.

In response to this assessment, BNL made a causal analysis on findings in the report to determine the underlying and root cause(s) of the observations. BNL's causal analysis agrees with the DOE's concern that the overall structure of the IH service delivery model is a leading contributor to the lack of a consistent exposure-monitoring program. The two root causes for this condition were determined to be

1. A lack of a specific, easily understood set of expectations for line management to conduct IH monitoring, and
2. Inadequate management of changes in delivering IH monitoring due to competing demands on Environment, Safety, Health and Quality (ESH&Q) personnel resources.

Below is list of the major action-item deliverables from the corrective action plan (ATS 2823).

Open Corrective Action Activities:

ATS 2823.11.1

Action Owner: R. Selvey
Action Title: Develop a list of job profiles that require routine monitoring
Action Description: Develop a list of job profiles that, due to anticipated routine exposure, require routine monitoring on an annual basis. This is part of the IH Exposure Monitoring Plan and is to be developed by each line organization.
Due Date: September 30, 2006 ***[Completed]***

♦ **ATS 2823.10.2**

Action Owner: P. Williams
Action Title: Determine Schedule for Baseline Exposure with BHSO
Action Description: In conjunction with BHSO, determine the appropriate implementation schedule for completing baseline exposure assessments with available resources.
Due date: September 30, 2006 ***[Completed]***

♦ **ATS 2823.10.5**
Action Owner: R. Selvey
Action Title: Complete exposure monitoring on high hazard operations
Action Description: Complete exposure monitoring on operations identified as high hazards with expedited resources if necessary.
Due Date: January 30, 2007 ***[Completed]***

♦ **ATS 2823.3.7**
Action Owner: P. Williams
Action Title: BSA/BHSO to review Policy Council Decision on IH Delivery Model
Action Description: BSA and BHSO meet to review the Policy Council decision and. If necessary, to plan further actions and due dates to complete any needed personnel and funding changes.
Due Date: May 30, 2007 ***[Completed]***

♦ **ATS 2823.7.1**
Action Owner: R. Selvey
Action Title: Complete Monitoring on Cutting/Welding/Brazing Operations
Action Description: Complete required monitoring on all cutting/welding/brazing operations as specified in the monitoring plan.
Due Date: September 30, 2006 ***[Completed]***

6.4 Energized Electrical Work Review (NFPA 70E) Action Plan

On April 18-21, 2005, an Office of Science (SC) Review Team assessed BNL's systems and processes for working on electrical systems. The Team was composed of electrical reviewers from the DOE's Office of Science, Office of Environment, Safety and Health (EH) as well as DOE Site Office staff and two independent electrical-safety consultants. They studied BNL's processes and their implementation, and assessed the training, oversight, and flow down of requirements to subcontractors.

The SC Review Team found that BNL recognizes the hazards associated with energized electrical work and is fully committed to compliance with National Fire Protection Association (NFPA) 70E, the governing electrical standard for the safety of employees working on energized electrical circuits. They observed that BNL has made significant progress and is currently implementing several upgrades to its electrical safety processes. They were favorably impressed with the level of implementation to date, and with the knowledge and attitude of all BNL's electrical workers. The SC Review Team's report discusses the findings and offers recommendations (summarized in the Conclusion) for BNL to consider in finalizing our electrical-safety process. In addition, BNL provided the Team with a March 30, 2005, BNL self-assessment report on their electrical-safety program that identifies actions for further improvement. The Review Team endorsed these actions.

Open Corrective Action Activities:

- **ATS 2725.16.1**

Action Owner: P. Williams
Action Title: Complete an analysis to determine Resources Required
Action Description: Complete an analysis of to determine the resources required to complete identified electrical-safety tasks identified. Work with the Laboratory's Management to obtain the resources.
Due Date: September 15, 2006 ***[Completed]***

- **ATS 2725.9.1**

Action Owner: C. Johnson
Action Title: Apply Generic Arc Flash Warning Labels
Action Description: BNL will apply generic arc flash warning labels on all electrical distribution panels
Due date: December 31, 2007

- **ATS 2725.8.2**

Action Owner: P. Williams
Action Title: Verify Closure Items from Electrical Safety Assessment
Action Description: Verify the closure of action items from the Electrical Safety Assessment
Due date: April 30, 2008

6.5 Authority Having Jurisdiction Nationally Recognized Testing Laboratory (NRTL) Action Plan

OSHA requires that equipment bearing the seal of the Underwriters Laboratories, Inc. (UL), Canadian Standards Association (CSA), Factory Mutual Global Technologies, LLC (FM), or another nationally recognized testing laboratory (NRTL) must be acquired whenever it is available, even if similar unlabeled equipment could be used. Participants in the recent OSHA site-wide review noted that vacuum controllers in Relativistic Heavy Ion Collider (RHIC) were being used, despite not being labeled by an NRTL. This was also identified as a finding in the *Brookhaven Site Office (BHSO) Surveillance Review of Electrical Equipment Acceptance.*

The National Electrical Code (NEC), National Fire Protection Association (NFPA) 70E - *Standard for Electrical Safety in the Workplace*, and Occupational Safety and Health Administration (OSHA) 29 CFR 1910 Subpart S, require that electrical equipment and installations are "acceptable to the Authority Having Jurisdiction (AHJ)." The Laboratory Electrical Safety Committee (LESC) is BNL's AHJ for electrical matters, as documented in BNL's safety standard ESH 1.5.0 - *Electrical Safety.* Review and acceptance by the LESC has

not been widely used in acceptance of equipment, although less formal reviews by the Laboratory Electrical Safety Officer (LESO) are frequent. The vacuum-controller issue revealed the need for BNL to implement a more formal and rigorous process for reviewing and accepting electrical equipment.

A corrective action plan was developed to bring BNL's program into compliance.

Open Corrective Action Activities

- **ATS 2944.6.6 - Legacy equipment review and approval:** Departments and divisions must prepare a plan addressing the review and approval of legacy equipment by the AHJ. Each plan must include a risk-based method for prioritizing review of equipment used by that organization, with the intention of quickly coming into compliance. Much of a great deal of BNL equipment has proved over time to be electrically safe. While this factor may be helpful in determining acceptance, equipment cannot be "grandfathered" and must ultimately be reviewed and documented. Facilities have a good deal of existing equipment of identical design, a fact that should expedite the review process through type-acceptance.
  Action Owner: J. Durnan
  Due Date: May 30, 2007 ***[Completed]***

- **ATS 2975.5.6 & 3112.3.2**: - Rather than simply updating existing legacy documents, the entire BNL electrical safety program will be converted to an SBMS subject area by the end of CY 06.
  Action Owner: J. Durnan
  Due Date: December 30, 2006 ***[Completed]***

- **ATS 3112.4.1:** - Completing the review and acceptance by the LAHJ of all BNL legacy equipment will take a significant amount of time, due in part to the amount of the equipment and in part to availability of individual items for inspection and review as a result of operating schedules of our major facilities. With implementation of the risk-based prioritization for review, the items remaining to be reviewed at the end of FY 07 will be those identified as low risk. Completion of all equipment reviews, based on the amount of equipment, accessibility of equipment, and the effort by qualified personnel, will be accomplished by the end of FY 09.
  Action Owner: J. Durnan
  Due Date: September 30, 2009

6.6 Inadequate Control of Procedures Action Plan

In September 2005, BNL self-identified a Price Anderson Amendment Act (PAAA) noncompliance condition (NTS-CH-BH-BNL-BNL-2005-0001 report) in the control of procedures *[the October 2005 "Evaluation of ISM at BNL" review team identified many of the findings previously identified in the NTS compliance condition]*. Institutional controls were less than adequate to ensure that laboratory -wide procedures (management systems, program descriptions, subject areas) and internal controlled documents (line organization internal procedures) remain current and consistent. The "Internal Controlled Documents" and

"Laboratory-Wide Procedures" do not go far enough in prescribing processes for assuring that procedures are adequately reviewed at an appropriate frequency, and for requiring a focused review of internal procedures when new or revised subject areas are issued.

From a causal analysis of the noncompliance, BNL identified the following causes:

- Subject areas either do not contain requirements to review procedures, or the requirements are not strict enough.
- Subject areas and/or procedures are not followed, indicating that enforcement needs improving.
- Since similar noncompliances were previously identified but not resolved, the corrective-action process needs improving.

BNL's process for developing and implementing subject areas allowed the issuance of less-than-rigorous procedures for reviewing SBMS and internal documents, and also adherence to these same flexible procedures. The omission of directions to review procedures either periodically and/or when underlying requirements change constitutes a clear symptom of this cause. Subject-area development teams were comprised, in part, of personnel from organizations desirous of protecting already existing local processes rather than developing and implementing better and more demanding procedures for accomplishing institutional objectives.

Open Corrective Action Activities

- **ATS 2935.2.1**
  Action Owner: S. Stein
  Delegate: J. Usher
  Action Title: Review/revise Internal Controlled Documents (ICD) subject area
  Action Description: Insert requirement into ICD to periodically review internal procedures for currency and consistency with requirements documented in SBMS. Document graded approach to periodicity; e.g., safety-significant procedures to be reviewed every two years while administrative procedures reviewed every five years. Document review criteria; i.e., state what constitutes a "review." Require review of collateral documents, i.e., those affected by revisions to procedure. Issue revised ICD subject area.
  Due Date: October 1, 2006 ***[Completed]***

- **ATS 2935.2.2**
  Action Owner: K Orta
  Delegate: J. Usher
  Action Title: Review/revise Lab-wide Procedures (LWP) subject area
  Action Description: Insert requirement into LWP to periodically review subject areas for currency and review for consistency with external requirements. Document graded approach to periodicity; e.g., safety-significant procedures to be reviewed every two years while administrative procedures reviewed every five years. Document review

criteria; i.e., state what constitutes a "review." Require review of collateral documents; i.e., those affected by revisions to subject area. Issue revised LWP subject area.
Due Date: October 1, 2006 ***[Completed]***

- **ATS 2935.2.3**
  Action Owner: J. Usher
  Action Title: Communicate revised procedure review requirements
  Action Description: Communicate/explain the revisions to ICD and LWP subject areas to affected stakeholders (QA Representatives, ES&H Coordinators, organizational administrative personnel, etc.). Communicate the required implementation date for procedure review requirements.
  Due Date: December 30, 2006 ***[Completed]***

- **ATS 2935.2.4**
  Action Owner: J. Usher
  Delegate: S. Stein
  Action Title: Verify implementation of procedure review process
  Action Description: Conduct a follow-up survey of "Procedure Managers" or their equivalents in BNL organizations to verify that organizations have implemented procedure review requirements.
  Due Date: June 1, 2007 ***[Completed]***

- **ATS 2935.2.5**
  Action Owner: R. Lebel
  Delegate: J. Usher
  Action Title: Validate effectiveness of Lab-Wide and Internal procedure review processes
  Action Description: The Quality Management Office will assemble and lead an independent assessment team to verify effectiveness of corrective actions.
  Due Date: December 1, 2007

7.0 "Evaluation of ISM at BNL" Recommendations and Other Improvement Initiatives

BNL's management continues to seek ways of improving safety performance by incorporating of best management practices, lessons learned and feedback from assessments into the Laboratory's practices. Many initiatives focused on improving safety processes and many corrective actions in this plan also are focused on process improvement. However, real improvements in BNL's safety culture at BNL will only come about from caring leadership and behavioral changes. To establish the commitment needed to achieve such changes specific, measurable, and attainable objectives must be established based on a vision for excellence in safety and clearly articulated expectations for improved safety performance.

7.1 "Evaluation of ISM at BNL" Assessment Recommendations

Beyond the "Evaluation of ISM at BNL" assessment and programmatic deficiencies, the review team offered BNL several recommendations and opportunities for improvement. Many of them spoke to

organization-specific issues that did not rise to BNL-wide applicability *[Note: Causal analyses were not performed on Evaluation of ISM recommendations]*

Corrective Action WBS-7.1.1
Radiological Protection Plan Revision
In general, Radiological Control external requirements are adequately addressed in Laboratory processes and procedures. However, a review of the scope of 10 CFR 835 *Radiation Protection Program* (RPP) indicates that they do not adequately cover radiological work performed off-site.

- Revise the scope of the RPP scope statement to clarify the requirements of 10CFR835 for off-site radiological work.
- Communicate RPP requirements to applicable managers and staff.

Management System: Radiological Control
Management System Steward: J. Tarpinian
Action Owner: C. Schaefer
Target Completion Date: Sep. 30, 2006 ***[Completed]***
Addresses Evaluation of ISM at BNL Recommendation RC-1

Corrective Action WBS-7.1.2
Radiological Awareness Report (RAR) Performance Expectations
After several interviews with Radiological Control Division (RCD) Staff, it became apparent that RARs are negatively viewed. There is a perception that documenting RARs will result in punishment and will degrade relationships between the Facility Support Representative staff and the line organization. Expectations about writing RARs should be clearly communicated to capture lower-level radiological events and provide feedback to improve the program.

- To provide feedback and drive improvement in the Radiological Control Program site-wide, the RCD will communicate RAR program expectations to appropriate managers and staff.

Management System: Radiological Control
Management System Steward: J. Tarpinian
Action Owner: C. Schaefer
Target Completion Date: April 30, 2006 ***[Completed]***
Addresses Evaluation of ISM at BNL Recommendation RC-3

Corrective Action WBS-7.1.3
Waste Management Representatives (WMR) Support Services Evaluation
The decline in numbers of WMRs is resulting in Environmental Compliance Representatives (ECRs) and ES&H Coordinators assuming waste packaging and inspection duties. The potential work overload for them and the inefficient utilization of subject-matter expertise might increase the risk of inadequate waste characterization and disposition of legacy materials. The evaluation and recommended path forward will be under this CA.

- Evaluate the way in which WMR support services are allocated to line organizations to obtain the most effective use of limited resources.

Management System: Environmental Management
Management System Steward: J. Tarpinian
Action Owner: G. Goode
Target Completion Date: May 15, 2006 ***[Completed]***
Addresses Evaluation of ISM at BNL Recommendation EM/WM-1

Corrective Action WBS-7.1.4
Life Sciences Performance Expectations
During the October 2005 "Evaluation of ISM at BNL" assessment, a walk through of the Biology and Medical Departments' space raised a number of concerns. The Department's housekeeping practices do not minimize the risk of slips, trips, falls, and spills. These conditions present an inconsistent safety culture "message" that tends to offset the good work being done in support experimental safety review (ESR) processes.

- The Life Sciences department will communicate safety and performance expectations to managers, supervisors, staff, visitors and guests to ensure a consistent understanding of expected outcomes. Specific expectations will include:
  - Individual responsibility for safely performing the mission good housekeeping practices, demonstration of a questioning attitude, and consideration of the potential adverse consequences of facility conditions and planned actions.

Management System: Facility Operations
Management System Steward: A. McNerney
Action Owner: W. Gunther
Target Completion Date: February 28, 2006 ***[Completed]***
Addresses Evaluation of ISM at BNL Recommendation EWP-1

Corrective Action WBS-7.1.5
Conduct of Operations Evaluation and Implementation
During the "Evaluation of ISM at BNL" conditions and behaviors at the Central Steam Facility were noted that are not consistent with the principles of good conduct of operations The general impression was that a number of issues do not represent the desired safety culture in Plant Engineering. Four broad areas of concern were identified: (1) shift routines and operating practices, (2) facility condition/housekeeping, (3) control of equipment and system status, and, (4) process chemistry. Similar observations were made during an Independent Oversight Review of Conduct of Operations in August 2003. The due dates of the Facilities and Operations Directorate corrective actions from this latter assessment were extended three times, and remain open. The actions below will address these concerns.

- Perform an extent of condition review to determine if conduct of operation noncompliance exists across operational facilities.

- The Internal Audit and Oversight Office will perform an effectiveness review of all corrective actions for the findings listed in the August 2003 Independent Oversight assessment.
- Review/Update existing F&O Directorate conduct of operations program to strengthen conduct of operations practices and assure compliance with program requirements. Expectations associated with activity include:
  - Conduct of inspections and tours
  - Operator knowledge and Procedure Development
  - Control area activities and Work authorization and documentation
  - Operating Practices and Operations Turnover
  - Control of Equipment and System Status
- Provide awareness training to applicable F&O staff on conduct of operations principles, program revisions and management expectations.

Management System: Facility Operations
Management System Steward: A. McNerney
Action Owner: R. Costa
Target Completion Date: January 30, 2007 ***[Completed]***
Addresses Evaluation of ISM at BNL Recommendations COO-1, COO-2 & COO-3

Corrective Action WBS-7.1.6
Nuclear Safety Authorization/Readiness

The "Evaluation of ISM at BNL" Review Team did not review the safety-authorization documentation at the Nuclear Hazard Category 3 Waste Management Facility. However, they recommended that BNL should review the facility's technical safety requirements (TSR), safety analysis report, the process for determining unreviewed safety questions, and the systems engineering program. The actions below will address this recommendation.

- Verify the implementation and compliance with 10CFR830, Subpart B, Nuclear Safety Management (such as the process for unreviewed safety question determination (USQD) process, configuration management, and TSR surveillance) *[Completed]*
- Assess documented safety bases and pertinent exclusions/exemptions for all BNL facilities that contain greater than a radiological-facility quantity of radionuclides, and physically inspect related facilities. *[Completed]*
- Offer training on unreviewed safety question (USQ) determination to managers and staff responsible for nuclear facilities (including those downgraded to radiological facilities) to improve their general understanding of the USQ process and its purpose. The training should be aligned with DOE Guide 424.1-1. *[Completed]*
- Conduct an external assessment to independently verify Essential Safety System Functionality. Its scope of the assessment will include engineering design and analysis, configuration management, safety basis documents, surveillance procedures for technical safety requirements, and the procurement of safety-related components. *[Completed]*

- Update the Natural Phenomena Hazard (NPH) Design Document. DOE Order 420.1B Chapter IV, Section 3 (c), 4 states "An NPH assessment review must be conducted at least every 10 years." *[Completed]*
- As a follow up to the assessment of documented safety bases and pertinent exclusions/exemptions for facilities that contain greater than a radiological-facility quantity of radionuclides, the following activities will be implemented to address opportunities for improvement.
  - The BNL Nuclear Safety Officer will perform an independent review and validation of special form source engineering evaluations;
  - The BNL Source Custodian will review and update of special form source #201091 File. This activity includes filing the Nuclear Regulatory Commission certificate of conformance for the aforementioned source;
  - Obtain correspondence/documentation from DOE-BHSO on concurrence of Building 463 radiological facility status;
  - Perform an extent of condition review of other sources >1% of the Hazard Category 3 threshold value to assure rollup to category 3 facility hazard categorization is not credible;
  - Perform a specialized TIER I inspection of source configurations/storage locations, and energy sources in areas containing sources to assure the sources are not challenged beyond their tested parameters in either normal or accident conditions;
  - Develop a more formal process for evaluating and documenting the special form status of sources at BNL; and
  - Consult with Senior Management on the methods/requirements for maintaining institutional documents (i.e. central repository or library) of facility authorization bases for nuclear and former nuclear facilities.
- Facility Safety Improvement Project Implementation
  - Perform a Facilities Safety Management Independent Assessment of the Laboratory's authorization documents for nuclear facilities, radiological facilities, accelerators, and other appropriate BNL facilities. *[Completed]*
  - Review self assessment report on special form status of category 3 nuclear material, facilities safety management independent assessment, independent oversight conduct of operations assessments, and assessment of the HFBR configuration management
  - Review the Institutions Nuclear Safety Program. Program elements to review include: the program structure and reporting relationship, nuclear safety committee charter, R2A2 of key nuclear safety personnel, and training and requirements for nuclear safety positions.
  - Develop a comprehensive integrated corrective action plan, which address the aforementioned review and nuclear safety topical areas (the plan shall be developed in accordance with DOE Guide 414.1-5, Corrective Action Program Guide.)

Management System: Facility Safety
Management System Steward: J. Tarpinian

Action Owner: S. Coleman
Target Completion Date: September 30, 2007
Addresses Evaluation of ISM at BNL Recommendation EM/WM-2

Corrective Action WBS-7.1.7
Operating Experience / Lessons Learned Initiatives
The "Evaluation of ISM at BNL" review team observed that the process of capturing, communicating, and incorporating Best Practices/Lessons Learned information is largely informal and may not be providing full value to the Laboratory.

- Expand distribution of published Lessons Learned (LL) Communications to include Level 1 and Level 2 managers, ES&H Coordinators, Work Control Managers, and Safety and Health Services personnel.
- Commence tracking and trending feedback received on each published LL Communication (i.e. will adopt, previously adopted, under investigation, not applicable, distributed for information, reading for interest only).
- Initiate a Bi-Annual LL Coordinators workshop to prompt feedback, evaluate, and improve the BNL LL program.

Management System: Quality Management
Management System Steward: J. Tarpinian
Action Owner: R. Lebel
Target Completion Date: December 31, 2006 ***[Completed]***
Addresses Evaluation of ISM at BNL Recommendation N/A

Corrective Action WBS-7.1.8
Construction Safety Subject Area
The team reviewing the "Evaluation of ISM at BNL" review team observed several deficiencies within the construction safety subject area. Specific ones include the following: (1) Section 1, step 2 of the subject area cannot be performed as written, (2) the subject area does not specify any training or competency requirements for project engineers or principal investigators assigned as the BNL Contact for construction, and (3) Plant Engineering uses a different construction inspection checklist than the one mandated by the Construction Safety Subject Area. The actions below will address this observation.

- Comprehensively review of the construction safety subject area, and incorporate applicable improvements and new requirements, if applicable into the subject area.
- Communicate revisions/changes and new requirements to appropriate managers and staff.

Management System: Worker Safety and Health
Management System Steward: J. Tarpinian
Action Owner: K. Krasner
Target Completion Date: February 28, 2007 ***[Completed]***
Addresses Evaluation of ISM at BNL Recommendation CF5-4

7.2 New Program Implementation - 10 CFR Part 850: Chronic Beryllium Disease Prevention, and Part 851: Worker Safety and Health Program Implementation

Department of Energy's (DOE) Final Rule, 10 CFR Part 850: Chronic Beryllium Disease Prevention and Part 851: Worker Safety and Health Program (referred to as the "Rule" hereafter) were published on February 9, 2006. The DOE's intent was to implement the statutory mandate establishing worker safety and health regulations to govern contractor's activities at the DOE sites. The intent of the Rule is to codify and enhance the worker protection program in operation, specifically the DOE's worker protection program requirements established in Order 440.1A "Worker Protection and Management for DOE Federal and Contractor Employees" and the "Integration of Environment, Health and Safety into Work Planning and Execution" clause stated in the DOE procurement regulations requiring contractors to establish an Integrated Safety Management (ISM) system. The Rule requires that DOE Contractors submit the Worker Safety and Health Program to the DOE for review and approval no later than 380 days after its publication.

The actions/activities described in this section are focused on identifying the specific steps necessary for BNL to achieve full compliance with the Rule by its effective date, February 9, 2007.

Improvement Action WBS-7.2.1:

Worker Safety and Health Rule Implementation

A project plan was developed to manage the implementation of 10CFR850 and 851 Rule. A gap analysis will be conducted by the SMEs for safety and health areas identified by the Rule. A Worker Safety and Health Working Group have been established to develop the Worker Safety and Health Program that must be submitted for approval to DOE by February 27, 2007. Additionally, the working group will: 1) Describe what additional actions need to take place; 2) what actions must occur to be fully compliant with the Rule; 3) Implement actions necessary assure compliance with the Worker Safety and Health Rule, including the completion of records of decision; 3) Develop roles, responsibilities, authorities and accountabilities (R2A2s) and identify responsible individuals; 4) Establish a process for identification and reporting of safety and health issues to the working group for evaluation and reporting to Noncompliance Tracking System (NTS); and 5) Provide training to management, staff and responsible individuals. Training to include a workshop for PAAA working group members on the safety and health reporting and evaluation criteria.

- Develop a Worker Safety and Health Program that complies with the rule requirements
- Subject matter experts to perform gap analyses on functional areas. This includes the development of a noncompliance screening form for field validations of the programs for which they are responsible. Gap analyses will be presented to, and evaluated by, the Working Group.
- Departments/Divisions will perform self-assessments of their programs to determine compliance and implementation of the rule. Implementation gaps that are identified will be discussed to determine the appropriate corrective actions.
- Develop and implement a corrective action plan that addresses gaps identified during gap analyses and department/division self-assessments

- The working will identify regulatory exemptions that BNL currently has approved through DOE, and re-submit variance requests. Variance request will be submitted in accordance with Subpart D of the Rule.
- Revise the Price Anderson Amendments Act (PAAA) investigations, inspections and reporting processes. The PAAA Program Description and PAAA working to include safety and health.
- Procurement and Property Management (PPM) flowdown of worker, safety and health rule requirements to subcontractors.

Management System:	Worker Safety and Health
Management System Steward:	J. Tarpinian
Action Owner:	P. Williams
Target Completion Date:	May 25, 2007 ***[Completed]***

7.3 Safety Improvement Initiatives

Improvement Action WBS-7.3.1
"Excellence in Environmental, Safety, Security and Health" Strategic Focus Area
Section 2.3 of this plan describes the six Strategic Focus Areas for the Laboratory, one of which is "Excellence in Environment, Safety, Security and Health (ESSH)." The Laboratory Director chartered a working group to develop management's expectations and commitment to achieve excellence in ESS&H performance. The group represents a body of key leaders who clearly demonstrate such a commitment, and those who have key functional responsibilities for ESS&H. The group's charge is to

- Define the attributes of excellence in ESS&H,
- Create a vision for Excellence in ESS&H for BNL,
- Describe the objectives for BNL to achieve excellence in ESS&H, and
- Develop goals and measures that track progress toward the Laboratory's objectives.

The working group will

- Examine various models of companies that exhibit best-in-class performance,
- Benchmark BNL's performance against them,
- Adopt a model that is suitable BNL,
- Create a vision for ESSH Excellence at BNL,
- Facilitate the needed management commitment so that BNL achieves excellence,
- Develop a set of key messages for BNL's management that articulates their commitment to excellence,
- Develop a set of measurable objectives for achieving excellence, and
- Develop a plan for communicating the vision, objectives, and measures to the BNL community.

This activity will be guided by central principles to:

- Integrate the key principles of environmental stewardship, safety, security and health into all aspects of work planning
- Create and communicate a central set of consistent messages about the vision and expectations for excellence in ESS&H
- Cultivate leadership at all levels of the organization
- Create a caring culture where people help each other to achieve excellence in ESS&H
- Create a learning culture where everyone's personal value is continuous improvement in ESS&H
- Strive to make achieving "Excellence in ESS&H" an inclusive process that encourages the involvement and ownership of the entire BNL community including employees, users, contractors and all others that live and work at Brookhaven National Laboratory
- Ensure accountability for ESS&H performance by responsible employees, supervisors, and managers

Management Systems:	Integrated Planning
Management System Steward:	P. Looney
Action Owner:	J. Tarpinian
Target Completion Date:	September 30, 2006 ***[Completed]***

Improvement Action WBS-7.3.2
Safety Observation Training or Managers and Supervisors
BNL managers and supervisors will receive training on how to perform behavioral safety observations in the field. The current TIER 1 inspection process promotes field observations of unsafe conditions, and there is no systematic training that teaches managers and supervisors the proper techniques to observe and provide feedback to workers on safe and at-risk behaviors.

Accordingly, BNL will implement a safety observation process for Level 1, 2, and 3 managers, as described in the PEMP performance target 5.2.1.1. Expectations for the implementing and performing the training and observation process will be set by the Laboratory Director and will include

- Training for Level 1, 2 and 3 managers
- The frequency and quality of field observations
- Documentation of field observations
- Disposition of field observations and follow-through tracking and trending of results

The training is being offered as part of a Battelle Corporate initiative to provide leadership and observation skills to managers and supervisors at laboratories that it manages and co-manages. DuPont Safety Services, a world-wide recognized expert in safety management and performance excellence, will offer the courses.

Management System:	Worker Safety and Health
Management System Steward:	J. Tarpinian
Action Owner:	P. Williams
Target Completion Date:	September 30, 2006 ***[Completed]***

Improvement Action WBS-7.3.3
OHSAS Registration Phase 3

BNL aspires to be the first DOE Laboratory to obtain third party registration for Occupational Health and Safety Assessment Series (OHSAS) 18001. BNL's occupational safety and health management system is designed to implement the core functions and guiding principles of ISM and, as such, conforms to the OHSAS standard. Several elements of the OHSAS standard enable BNL to improve its implementation of ISM, especially at the activity level. Conformance to the OHSAS standard and third party registration to the standard provides the advantages of:

- Continuous improvement from feedback obtained by routine internal and external (third party) assessments,
- Worker involvement in evaluating and mitigating risks from occupational hazards at the activity level through the development and maintenance of job risk analyses, and
- Management involvement through the required annual management review and the development of goals, objectives and measures based on the previous years' implementation experience and assessment.

The Laboratory Director established a three-year goal to achieve lab wide registration for OHSAS 18001. Subsequently, BNL was successfully registered by a third party registrar in the first two phases of OHSAS registration. The lab wide registration goal will be achieved upon the successful review and registration of the Phase 3 departments and divisions, which is on schedule.

The objectives of completing the job risk analyses and the management reviews required by the standard are described in BNL's Performance Evaluation Measurement Plan (PEMP) performance targets:

- **PEMP Performance Target 5.2.1.2**
  BNL will provide processes that ensure worker, scientist and technician participation in hazards assessment, evaluation and mitigation at the "task level." Accordingly, BNL will complete Job Risk Assessments for all departments and divisions by the end of FY06.

- **PEMP Performance Target 5.2.1.4**
  BNL will demonstrate management involvement through an effective management review process. BNL will institutionalize a formal management review process for all Directorates by the end of FY06. The management review will:

  - review ESH performance against the established annual goals and objectives,
  - evaluate performance of departments and divisions in the Goal 5 performance objectives, and
  - establish goals and objectives for the next year

Management System: Worker Safety and Health
Management System Steward: J. Tarpinian
Action Owner: P. Williams

Target Completion Date: December 31, 2006 ***[Completed]***

Improvement Action WBS-7.3.4
Employee Concerns Program Evaluation
As part of BNL Lessons Learned program and Benchmarking Best Practices, the Laboratory reviewed the DOE Inspection of Environment, Safety, and Health Programs at Savannah River Site Report to identify best practices and improvement opportunities to be employed at BNL. Based on the review, the Laboratory concluded that the Employee Concerns Program (ECP) should be evaluated for compliance with DOE Order 442.1A, Department of Energy Employee Concerns Program. The evaluations' scope will include the following areas:

- Verification that ECP posters are placed in sufficient conspicuous locations.
- Verification of required time frames for investigation completion, and requirements for documentation of justification of extensions.
- Verification of ECP implementing procedure(s)

Management System: Human Resources
Management System Steward: W. Hempfling
Action Owner: S. Coleman
Target Completion Date: March 30, 2007 ***[Completed]***

Improvement Action WBS-7.3.5
Executive Management Training Program
As discussed under the Institutional Feedback and Improvement Section, Brookhaven executives and managers have varying skills, knowledge, experience, and perspectives on management principles and practices. As a pilot to the executive management symposia for Laboratory Level 1 and Level 2 Managers, Laboratory Operations Managers will participate in an Executive Management Training Program. The program will provide operations leaders with a solid command of successful management approaches and a common management vocabulary.

Management System: N/A
Management System Steward: M. Bebon
Action Owner: R. Lebel
Target Completion Date: January 31, 2007 ***[Completed]***

Improvement Action WBS-7.3.6
Electronic Delivery of Experimental Safety Review Forms Evaluation
Evaluate the establishment of an electronic delivery experimental safety review form that can link to job risk assessments, medical protocols, Brookhaven Training Management System (BTMS) Job Training Assessments (JTAs) and lessons learned documents. The evaluation should include benchmarking Pacific Northwest National Laboratory (PNNL) and Oak Ridge National Laboratory (ORNL) processes; suggest improvements, good practices, and lessons learned for wider application to the Work Control Management System Steward.

Management System:	Work Planning and Control
Management System Steward:	M. Bebon
Action Owner:	P. Carr
Target Completion Date:	February 27, 2007 ***[Completed]***

Improvement Action WBS-7.3.7
Effectiveness of Off-Site Integrated Safety Management
The Laboratory will evaluate ISM processes and flow down to BNL personnel performing work off-site (i.e. safety at CERN).

Management System:	Integrated Assessment Program
Management System Steward:	J. Tarpinian
Action Owner:	S. Coleman
Target Completion Date:	September 30, 2007

Improvement Action WBS-7.3.8
Institutional Safety Committees Reporting Structure Review

- The Laboratory will perform an evaluation of the Institutional safety committee's structure to identify improvements and efficiencies. The results of this evaluation will be presented to the Deputy Director for Operations. *[Completed]*
- Re-Engineer the Safety Committee Reporting structure to address improvements and efficiencies identified from the review and workshops with key committee chair persons. Committee charters and membership will be revised as appropriate.

Management System:	Integrated Assessment Program
Management System Steward:	J. Tarpinian
Action Owner:	S. Coleman
Target Completion Date:	December 30, 2007

Improvement Action WBS-7.3.9
Feedback and Improvement, and Work Planning and Control Follow-Up Review
In the fall of 2006, BNL conducted an ISMS Readiness Review. The review identified a number of areas of potential improvement or enhancement to the overall ISMS Program. BNL subsequently developed an ISM/Safety Improvement Project Plan outlining its approach to addressing weaknesses identified in the ISMS Readiness Review as well as in several prior, related reviews. McCallum-Turner, Inc. personnel (Ken Brog and Bob McCallum) were members of the ISMS Readiness Review Team. BNL now wishes to determine to what extent early implementation of key Corrective Action Plan elements is proceeding as intended and required.

Management System:	Integrated Assessment Program
Management System Steward:	J. Tarpinian
Action Owner:	S. Coleman
Target Completion Date:	October 30, 2006 ***[Completed]***

VI Project Baselines and Controls

The project's cost estimate (excluding contributed resources) in at year dollars, including escalation and burden, totals $970 thousand, with budget authority of $420 thousand in FY 2006, and $550 thousand in FY 2007. The cost, schedule, and technical (corrective actions) baselines for the ISM/Safety Improvement Project are established in the schedule presented in section VI.2.

VI.a Cost Baseline ($)

ISM Project Management & Support				539,000
	Project Management		319,000	
	External Support		220,000	
WBS 1.0	Institutional Feedback and Performance Improvement			14,000
WBS 2.0	Work Planning and Control Performance Improvement			136,300
	WBS 2.1	Work Performance Enhancements	114,300	
	WBS 2.2	Qualifications and Training	22,000	
WBS 3.0	Documentation Initiatives			19,000
	WBS 3.1	Key Programmatic Documents	19,000	
	WBS 3.2	Requirements Management	N/I	
WBS 4.0	Communication and Involvement			33,600
	WBS 4.1	New/Revised Documents	33,600	
WBS 5.0	Collider Accelerator Arc Flash Incident			N/I[1]
	WBS 5.1	DOE Type B Team Interim Actions.	N/I	
	WBS 5.2	BNL Corrective Actions	N/I	
WBS 6.0	Ongoing Action Plans			29,600
WBS 7.0	"Evaluation of ISM at BNL" Recommendations & Improvements			207,000
	WBS 7.1	Evaluation of ISM Recommendations	30,700	
	WBS 7.2	Worker Safety and Health Program	176,300[2]	
	WBS 7.3	Safety Improvement Initiatives	N/I	
Total Estimated Cost				**970,000**

[1] N/I – Not included in the project's cost estimate.

[2] This estimate does not include costs associated with industrial hygiene monitoring. It is based on resources required to support the ISM/Safety Improvement Project objectives.

BNL ISM/Safety Improvement Project Plan (ATS# 2944)

ID	WBS	Task Name	% Complete	Actual Start	Baseline Start	Actual Finish	Baseline Finish
1	**0**	**BNL ISM/Safety Improvement Project**	**91%**	**Mon 12/12/05**	**Mon 12/12/05**	**NA**	**Tue 1/13/09**
2	**1.0**	**Institutional Feedback & Performance Improvement Initiatives**	**91%**	**Wed 3/1/06**	**Mon 5/1/06**	**NA**	**Fri 11/2/07**
3	**1.1**	**Laboratory Strategy-Focused Framework**	**100%**	**Mon 5/1/06**	**Mon 5/1/06**	**Wed 5/30/07**	**Wed 5/30/07**
4	1.1.1	Complete initial SFA Planning and Performance Management Documents -- Start and Kickoff Parallel Task/Activities	100%	Mon 5/1/06	Mon 5/1/06	Wed 11/15/06	Wed 11/15/06
5	1.1.2	Realign Quarterly Institutional Level Reporting Along SFA Framework	100%	Wed 5/3/06	Mon 10/2/06	Thu 12/21/06	Fri 12/29/06
6	1.1.3	Develop and Implement Management Symposia	100%	Tue 8/1/06	Tue 1/2/07	Wed 5/30/07	Wed 5/30/07
7	1.1.4	Develop, Publish, and Implement Integrated Planning and Performance Management/Assurance Calendar	100%	Fri 6/2/06	Fri 7/7/06	Fri 9/29/06	Sat 9/30/06
8	**1.2**	**Institutional Decision Making and Assurance Processes**	**95%**	**Mon 5/1/06**	**Mon 5/1/06**	**NA**	**Sun 9/30/07**
9	1.2.1	Define and Develop SFA Analysis Capability	40%	Thu 12/21/06	Thu 4/26/07	NA	Sun 9/30/07
10	1.2.2	Establish Institutional Prioritization Framework	100%	Wed 11/29/06	Wed 11/29/06	Fri 3/30/07	Fri 3/30/07
11	1.2.3	Define and Implement a Contractor Assurance Process	100%	Mon 5/1/06	Mon 5/1/06	Fri 9/29/06	Sat 9/30/06
12	1.2.4	Event/Issues Management Processes	100%	Mon 5/1/06	Mon 5/1/06	Fri 10/20/06	Sun 12/31/06
13	1.2.5	Upgrade/Re-Tool the Assessment Tracking System	100%	Mon 5/1/06	Mon 5/1/06	Fri 10/20/06	Wed 2/28/07
14	1.2.6	Establish Common Institutional Level Data Collection and Reporting Process and Tool	95%	Tue 8/15/06	Fri 12/15/06	NA	Sun 9/30/07
15	**1.3**	**Align Resource Allocation Processes**	**100%**	**Mon 8/28/06**	**Mon 9/18/06**	**Tue 7/24/07**	**Mon 7/30/07**
16	1.3.1	Refine and Redefine Institutional Level Discretionary Allocation Processes Description	100%	Mon 8/28/06	Mon 9/18/06	Mon 4/30/07	Tue 7/31/07
17	1.3.2	Define and Implement an Organizational Unit Business Planning Process	100%	Tue 5/15/07	Tue 1/2/07	Tue 7/24/07	Mon 7/30/07
18	1.3.3	Integrate Decision and Budget Allocation Processes into Planning and Performance Management/Assurance Calendar	100%	Thu 3/1/07	Tue 1/2/07	Mon 5/28/07	Wed 5/30/07
19	**1.4**	**Verify Sustainability & Effectiveness**	**69%**	**Wed 3/1/06**	**Mon 5/1/06**	**NA**	**Fri 11/30/07**
20	1.4.1	Complete comprehensive gap analysis against key program design input requirements and expectations	100%	Mon 5/15/06	Tue 6/20/06	Wed 7/19/06	Thu 7/20/06
21	1.4.2	Update Re-Engineering Project Plan as necessary to address gaps identified under WBS Activity 1.4.1	100%	Mon 7/17/06	Thu 7/20/06	Thu 8/31/06	Sun 7/30/06
22	1.4.3	Review and update as necessary middle management (Level 2) and staff R2A2s and Performance Plans/Personal Goals to Reflect Strategy Execution and Assurance	40%	Thu 6/8/06	Mon 7/9/07	NA	Sun 9/30/07
23	1.4.4	Complete Analysis of the Adequacy of Institutional Commitment to Independent Oversight (third party review)	100%	Wed 3/1/06	Mon 5/1/06	Fri 8/25/06	Fri 8/25/06
24	1.4.5	Review and Refine as Necessary Roles and Practices of Institutional Councils	100%	Mon 6/19/06	Mon 6/12/06	Wed 8/30/06	Fri 9/29/06
25	1.4.6	Review Organizational Roles, Structure, and Resources and Make necessary changes to optimize effectiveness and efficiency of on-going administration of performance Management Processes	100%	Mon 4/16/07	Mon 4/2/07	Sat 6/30/07	Sat 6/30/07
26	1.4.7	Review and update as necessary Senior Management R2A2s and performance plans/personal goals to reflect strategy execution and assurance	100%	Mon 7/24/06	Mon 8/7/06	Wed 2/28/07	Wed 2/28/07

BNL ISM/Safety Improvement Project Plan (ATS# 2944)

ID	WBS	Task Name	% Complete	Actual Start	Baseline Start	Actual Finish	Baseline Finish
27	1.4.8	Conduct an effectiveness review of the performance Management Program re-engineering effort	25%	Mon 5/14/07	Mon 6/18/07	NA	Fri 11/30/07
28	1.4.9	Establish and implement a process to verify personnel responsible for managing and performing assurance activities	25%	Mon 5/14/07	Mon 8/6/07	NA	Sun 9/30/07
29	1.4.10	Establish minimum requirements for personnel responsible for managing and performing assurance activities (address gap analysis finding "personnel possess appropriate experience, knowledge, skills and abilities"). Include in contractor assurance descript	100%	Tue 10/24/06	Fri 10/13/06	Thu 12/21/06	Sat 12/30/06
30	**2.0**	**Work Planning & Control Performance Improvement Initiatives**	**95%**	**Wed 3/15/06**	**Mon 5/1/06**	**NA**	**Sun 9/30/07**
31	**2.1**	**Work Performance Improvement Initiatives**	**100%**	**Wed 3/15/06**	**Mon 5/1/06**	**Fri 7/20/07**	**Tue 5/15/07**
32	**2.1.1**	**Integrate Work Planning & Control into the Laboratory's Strategic Planning Process**	**100%**	**Mon 5/15/06**	**Mon 5/22/06**	**Fri 6/9/06**	**Mon 6/19/06**
33	2.1.1.1	Assign a work planning and control representative to the ESS&H SFA Team	100%	Mon 5/15/06	Mon 5/22/06	Fri 5/26/06	Mon 5/29/06
34	2.1.1.2	Incorporate a strong commitment to work planning & control into the SFA goals and objective for the ESS&H SFA	100%	Mon 6/5/06	Fri 6/9/06	Fri 6/9/06	Mon 6/19/06
35	**2.1.2**	**Create a Culture of "All Work is Planned" and Supporting Procedures and Methodologies**	**100%**	**Mon 5/15/06**	**Mon 5/22/06**	**Fri 7/20/07**	**Fri 9/14/07**
36	2.1.2.1	Define and implement a "Worker Planned Work" process (i.e. re-define and enhance skill of the worker determinations hazard-analysis requirements and communication of hazards)	100%	Mon 5/15/06	Mon 5/29/06	Fri 7/20/07	Wed 7/25/07
37	2.1.2.2	Evaluate the quality of job risk assessments based on their impact on worker planned work and institutional risk. Revise/update JRA's as appropriate	100%	Fri 5/25/07	Fri 5/25/07	Fri 7/13/07	Sun 9/30/07
38	2.1.2.3	Develop a process to fully integrate Job Risk Analyses and Facility Risk Analyses into the Work Planning & Control Process	100%	Mon 5/15/06	Mon 5/29/06	Fri 7/20/07	Fri 6/29/07
39	2.1.2.4	Improve processes for hazards analysis and mitigation where multiple hazards exist and interact; e.g. multi-craft jobs	100%	Thu 6/29/06	Thu 7/20/06	Fri 7/20/07	Fri 6/29/07
40	2.1.2.5	Integrate Lessons-Learned data into all Work Planning & Control processes	100%	Tue 6/27/06	Mon 6/26/06	Thu 11/30/06	Fri 10/20/06
41	2.1.2.6	Develop requirements for consideration of multiple hazards and their interaction	100%	Thu 6/29/06	Thu 7/27/06	Thu 11/30/06	Fri 10/20/06
42	**2.1.3**	**Clarify Building Manager Role in Work Planning & Control**	**100%**	**Mon 5/1/06**	**Mon 5/1/06**	**Fri 8/11/06**	**Thu 11/2/06**
43	2.1.3.1	Evaluate the data collected from the Bldg Manager work notification pilot and use the results to define the role of the Bldg Manager in WP&C, specifically the required interaction between Bldg Manager & WCM.	100%	Mon 5/1/06	Mon 5/1/06	Fri 8/11/06	Wed 7/12/06
44	**2.1.4**	**Address Gaps in ISM Flow down Processes for Subcontractors and Vendors**	**100%**	**Wed 3/15/06**	**Mon 5/1/06**	**Tue 12/19/06**	**Thu 11/2/06**
45	2.1.4.1	Supplement existing ISM requirements flow-down procurement processes to include small contracts, service work, and warranty work where actual work is performed on site	100%	Wed 3/15/06	Mon 5/1/06	Thu 6/8/06	Fri 6/2/06
46	2.1.4.2	Modify contract, purchase order, and other procurement terms and conditions	100%	Mon 5/15/06	Mon 6/5/06	Fri 7/7/06	Mon 6/19/06
47	2.1.4.3	Integrate review and approval of web requisitions by WCMs and/or Coordinators where work is to be performed on-site. Provide training on the new process and implement/go live	100%	Mon 5/15/06	Tue 6/20/06	Tue 12/19/06	Thu 7/20/06

BNL ISM/Safety Improvement Project Plan (ATS# 2944)

ID	WBS	Task Name	% Complete	Actual Start	Baseline Start	Actual Finish	Baseline Finish
48	**2.1.5**	**Work Planning Processes for Job Change Control**	**100%**	**Mon 5/15/06**	**Mon 5/29/06**	**Fri 11/24/06**	**Thu 11/2/06**
49	2.1.5.1	Develop procedures for addressing "scope creep" or changes in the work after the completion of initial planning	100%	Mon 5/15/06	Mon 5/29/06	Fri 11/24/06	Wed 7/26/06
50	2.1.5.2	Conduct workshops/training with Work Control Managers/Coordinators and workers to communicate job change control process and institutional expecations	100%	Thu 11/2/06	Tue 1/2/07	Fri 11/24/06	Fri 2/16/07
51	**2.1.6**	**Upgrade Work Planning & Control Management System Assessment Plan**	**100%**	**Mon 5/15/06**	**Fri 11/3/06**	**Fri 5/4/07**	**Fri 3/30/07**
52	2.1.6.1	Define success factors for the WP&C Management System	100%	Thu 1/18/07	Fri 11/3/06	Wed 2/28/07	Wed 2/28/07
53	2.1.6.2	Define the risks associated with the management system	100%	Thu 1/18/07	Fri 11/3/06	Wed 2/28/07	Wed 2/28/07
54	2.1.6.3	Identify quantitative measures to track and report management system performance	100%	Thu 1/25/07	Fri 11/10/06	Wed 2/28/07	Fri 6/29/07
55	2.1.6.4	Incorporate measures into quarterly reporting of management system status as part of Contractor and Corporate Assurance	100%	Mon 5/15/06	Tue 11/28/06	Fri 3/30/07	Fri 6/29/07
56	2.1.6.5	Formalize the role of WCMs quarterly feedback session in management system assessment and improvement planning	100%	Mon 5/15/06	Fri 11/17/06	Fri 5/4/07	Fri 6/29/07
57	2.1.6.6	Update the WP&C Assessment Tool	100%	Thu 2/8/07	Tue 11/28/06	Tue 5/1/07	Fri 6/29/07
58	**2.1.7**	**Integrate Human Performance Factors Principles into the Work Planning and Control Management System**	**100%**	**Fri 7/21/06**	**Thu 7/27/06**	**Fri 6/1/07**	**Tue 5/1/07**
59	2.1.7.1	Integrate the "Four Key Questions" into the Pre-Job briefing process	100%	Fri 7/21/06	Thu 7/27/06	Thu 11/30/06	Wed 8/30/06
60	2.1.7.2	Develop an approach to include error precursors in the hazards analysis process	100%	Mon 7/24/06	Thu 7/27/06	Fri 6/1/07	Fri 6/29/07
61	2.1.7.3	Develop and provide longer term recommendations for a more comprehensive integration process to the MS Steward	100%	Thu 10/26/06	Thu 8/31/06	Wed 2/28/07	Fri 4/27/07
62	**2.2**	**Work Planning and Control Qualification/Training**	**86%**	**Mon 5/1/06**	**Mon 5/1/06**	**NA**	**Sun 9/30/07**
63	**2.2.1**	**Upgrade Work Control Manager and Coordinator Training & Qualifications**	**99%**	**Mon 5/1/06**	**Mon 5/1/06**	**NA**	**Sun 9/30/07**
64	2.2.1.1	Review Current training & qualifications requirements for Work Control Mangers and Work Control Coordinators	100%	Mon 5/1/06	Mon 5/1/06	Mon 6/12/06	Mon 6/12/06
65	2.2.1.2	Revise Existing training and add new requirements as appropriate	100%	Mon 5/15/06	Tue 6/13/06	Fri 6/29/07	Fri 6/29/07
66	2.2.1.3	Develop a schedule for re-qualifying Work Control Managers and Coordinators through training & testing	100%	Fri 10/27/06	Fri 8/11/06	Fri 6/29/07	Fri 6/29/07
67	2.2.1.4	Update the Work Planning & Control Management System and Subject Areas, and Job Training Assessment (JTA) as applicable	75%	Wed 11/1/06	Tue 10/17/06	NA	Sun 9/30/07
68	**2.2.2**	**Revitalize the Training Program for Work Control Managers & Work Control Coordinators**	**53%**	**Mon 9/11/06**	**Fri 8/11/06**	**NA**	**Fri 12/28/07**
69	2.2.2.1	Develop a classroom training curriculum that offers scenario-based, or "case study" training	55%	Mon 10/2/06	Fri 8/11/06	NA	Fri 12/28/07
70	2.2.2.2	Add to or enhance the following elements of the training program (screening work, preparing work permits, performing job hazard analyses, job walk-down and job review, pre and post-job briefing, & soliciting worker feedback	55%	Mon 10/2/06	Fri 8/18/06	NA	Fri 12/28/07
71	2.2.2.3	Upgrade the computer (web) based training to incorporate case studies	55%	Mon 9/11/06	Mon 9/18/06	NA	Fri 12/28/07

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ID	WBS	Task Name	% Complete	Actual Start	Baseline Start	Actual Finish	Baseline Finish
72	2.2.2.4	Institute learning validation through testing	35%	Thu 4/5/07	Mon 10/30/06	NA	Fri 12/28/07
73	2.2.2.6	Incorporate all changes resulting from corrective actions in this plan in the revised WCM/WCC training/re-training as applicable	55%	Wed 11/1/06	Fri 10/27/06	NA	Fri 12/28/07
74	2.3	WP&C Management System and Subject Area Revisions/Updates. Includes the process for worker planned work, clarify the role of building managers, flowdown to subcontractors, training, job change control and human performance principles	90%	Fri 7/28/06	Mon 11/6/06	NA	Fri 9/14/07
75	**3.0**	**Documentation Improvement Initiatives**	**88%**	**Mon 12/12/05**	**Mon 5/1/06**	**NA**	**Tue 8/5/08**
76	**3.1**	**Key Programmatic Document Initiatives**	**100%**	**Wed 2/1/06**	**Mon 5/1/06**	**Fri 7/13/07**	**Fri 1/12/07**
77	**3.1.1**	**Evaluate Consolidation of ISM Related Management Systems; Upgrade Program Description**	**100%**	**Mon 5/1/06**	**Mon 5/1/06**	**Fri 1/12/07**	**Fri 1/12/07**
78	3.1.1.1	Evaluate Consolidation of ISM Related Management Systems; Upgrade ISM Program Description	100%	Mon 5/1/06	Mon 5/1/06	Fri 1/12/07	Thu 11/16/06
79	3.1.1.2	Designate a single point of contact for the new management system, if applicable	100%	Fri 1/12/07	Fri 11/17/06	Fri 1/12/07	Mon 11/27/06
80	3.1.1.3	Develop a presentation to actively communicate the significant changes resulting from this consolidation	100%	Fri 1/12/07	Tue 11/28/06	Fri 1/12/07	Fri 1/12/07
81	3.1.2	Incorporate Annual ISM Documentation Review into Lab Planning & Assessment	100%	Mon 9/25/06	Mon 9/25/06	Fri 9/29/06	Sat 9/30/06
82	**3.1.3**	**Correct specific Procedure Deficiencies from Evaluation of ISM Assessment**	**100%**	**Wed 2/1/06**	**Mon 5/1/06**	**Fri 8/25/06**	**Wed 8/30/06**
83	3.1.3.1	Review Evaluation of ISM Report and capture all references to documentation/procedure deficiencies	100%	Wed 2/1/06	Mon 5/1/06	Fri 5/5/06	Mon 8/7/06
84	3.1.3.2	Distribute deficiencies to appropriate management system stewards for correction	100%	Mon 2/20/06	Tue 8/8/06	Fri 6/2/06	Wed 8/16/06
85	3.1.3.3	Submit Notice of Intent (NOI) to the SBMS Office for incorporation into the SBMS Completion Project	100%	Fri 6/30/06	Thu 8/17/06	Fri 8/25/06	Thu 8/31/06
86	**3.1.4**	**Realign Management System Steward Reporting Structure**	**100%**	**Mon 5/1/06**	**Mon 5/1/06**	**Fri 7/28/06**	**Tue 8/1/06**
87	3.1.4.1	Revise appropriate SBMS documentation to reflect new reporting relationship	100%	Mon 5/1/06	Mon 5/1/06	Tue 7/18/06	Tue 8/1/06
88	3.1.4.2	Brief Laboratory Director and Deputy Director for Science on their new responsibilities	100%	Fri 7/21/06	Thu 7/27/06	Mon 7/24/06	Fri 7/28/06
89	3.1.4.3	Deliver to the HR Management System Steward/Point of Contact additional R2A2 responsibilities for Lab Director, DDO, DDS and MSS's	100%	Mon 7/24/06	Mon 7/31/06	Fri 7/28/06	Tue 8/1/06
90	**3.1.5**	**Roll- up Roles and Responsibilities to Management System Level; Include Management System Stewards and Points of Contact - Operations Group**	**100%**	**Wed 5/3/06**	**Mon 5/22/06**	**Fri 7/13/07**	**Fri 6/1/07**
91	3.1.5.1	Revise SBMS Document guidelines to incorporate a requirement that all roles and responsibilities in any management system documents be summarized in the management system description	100%	Wed 5/3/06	Fri 9/29/06	Fri 9/1/06	Thu 10/26/06
92	3.1.5.2	In coordination with POCs, and HR Search all SBMS documents to identify all such roles and responsibilities	100%	Thu 6/1/06	Mon 5/22/06	Fri 4/27/07	Fri 3/23/07
93	3.1.5.3	Update management system descriptions as appropriate	100%	Wed 7/5/06	Mon 8/7/06	Fri 7/13/07	Fri 6/1/07
94	3.1.5.4	Summarize management system responsibilities by position	100%	Thu 6/1/06	Mon 8/28/06	Fri 7/13/07	Fri 6/1/07

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ID	WBS	Task Name	% Complete	Actual Start	Baseline Start	Actual Finish	Baseline Finish
95	3.1.5.5	Deliver to the Human Resources Management System Steward/POC for incorporation of responsibilities in MSS and Point of Contact R2A2s	100%	Fri 8/11/06	Fri 9/29/06	Fri 6/1/07	Fri 6/1/07
96	**3.2**	**Requirements Management Implementation**	**79%**	**Mon 12/12/05**	**Mon 5/1/06**	**NA**	**Fri 8/15/08**
97	**3.2.1**	**Complete Requirements Management Process Improvements**	**74%**	**Mon 12/12/05**	**Mon 5/1/06**	**NA**	**Fri 8/15/08**
98	3.2.1.1	Phase 1: Execute the Process of Requirements verification (i.e develop software tools, pilot verification process, bin management systems & train management system stewards)	71%	Mon 12/12/05	Mon 5/1/06	NA	Fri 4/27/07
99	3.2.1.2	Phase 2: Test, Modify and Rollout Electronic Rod Tools	100%	Mon 5/1/06	Mon 5/1/06	Fri 6/29/07	Fri 6/29/07
100	3.2.1.3	Phase 3: Contract Mapping - This activty assures all contract requirements and legal obligations are mapped to appropriate management systems.	50%	Fri 6/29/07	Mon 10/1/07	NA	Fri 8/15/08
101	**3.2.2**	**Verify Legacy Document Content in SBMS**	**100%**	**Fri 5/26/06**	**Thu 6/1/06**	**Thu 3/15/07**	**Fri 6/29/07**
102	3.2.2.1	Update the SBMS Completion Project Scope, responsibilities, and schedule	100%	Fri 5/26/06	Thu 6/1/06	Thu 7/27/06	Fri 8/18/06
103	3.2.2.2	Secure commitment of contributed and/or incremental resources	100%	Fri 5/26/06	Tue 8/22/06	Tue 7/11/06	Fri 10/20/06
104	3.2.2.3	Implement the SBMS Completion Project in accordance with the approved plan	100%	Thu 8/31/06	Mon 8/21/06	Fri 12/29/06	Sat 12/30/06
105	3.2.2.4	Document revision histories and review dates for the legacy documents	100%	Mon 1/8/07	Mon 1/8/07	Thu 3/15/07	Fri 6/29/07
106	**4.0**	**Communication & Involvement Initiatives**	**100%**	**Wed 3/1/06**	**Mon 5/1/06**	**Tue 5/29/07**	**Mon 1/8/07**
107	**4.1**	**New / Revised Document Communications**	**100%**	**Wed 3/1/06**	**Mon 5/1/06**	**Tue 5/29/07**	**Mon 1/8/07**
108	4.1.1	Communicate Revisions and Work Control Requirements	100%	Thu 11/30/06	Wed 12/6/06	Thu 1/18/07	Mon 1/8/07
109	4.1.2	ISM Web Based Training and Laboratory Communications	100%	Wed 3/1/06	Mon 5/1/06	Fri 8/18/06	Mon 8/28/06
110	4.1.3	Operations Forum Evaluation / Implementation	100%	Wed 3/1/06	Wed 6/28/06	Fri 1/19/07	Thu 2/15/07
111	4.1.4	Worker Safety and Health Rule Workshops/Training Awareness	100%	Tue 8/1/06	Mon 11/6/06	Wed 1/24/07	Tue 12/5/06
112	4.1.5	Barrier Analysis & Five Whys Causal Analyses workshops	100%	Mon 7/31/06	Tue 8/1/06	Fri 12/15/06	Fri 12/29/06
113	4.1.6	Human Performance Strategy and Implementation Plan Development	100%	Mon 8/21/06	Mon 8/28/06	Tue 5/29/07	Thu 5/31/07
114	**5.0**	**Collider Accelerator Arc Flash Type B Incident**	**85%**	**Mon 5/1/06**	**Mon 5/1/06**	**NA**	**Tue 12/30/08**
115	**5.1**	**DOE Type B Team Interim Recommendations**	**100%**	**Mon 5/1/06**	**Mon 5/1/06**	**Fri 11/10/06**	**Mon 4/30/07**
116	**5.1.1**	**Doe Team Interim Recommendation #1 -- Dress for Hazard Category for 480v circuit breaker and switch operation. Interim action to remain in place until Laboratory actions are completed.**	**100%**	**Mon 5/1/06**	**Mon 5/1/06**	**Mon 7/24/06**	**Thu 9/28/06**
117	5.1.1.1	Lab Action #1 Review the NFPA 70E standards and review their adequacy for personal protective equipment	100%	Mon 5/1/06	Mon 5/1/06	Fri 7/7/06	Thu 9/7/06
118	5.1.1.2	Lab action #2 Upgrade the Laboratory Electrical Safety Standards to better address arc flash personal protective equipment	100%	Mon 5/1/06	Mon 5/1/06	Fri 7/21/06	Thu 9/7/06
119	5.1.1.3	Publish upgraded standard in SBMS or local procedures as appropriate	100%	Fri 7/7/06	Fri 9/8/06	Mon 7/24/06	Thu 9/28/06

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ID	WBS	Task Name	% Complete	Actual Start	Baseline Start	Actual Finish	Baseline Finish
120	**5.1.2**	**DOE Team Interim Recommendation #2 -- Review the practice of racking circuit breakers with bus energized or inserting/removing MCC starter buckets while MCC is energized**	**100%**	**Mon 5/1/06**	**Mon 5/1/06**	**Thu 9/21/06**	**Fri 7/28/06**
121	5.1.2.1	Lab Action #1 Review current procedures to evaluate whether the practice of racking circuit breakers into live bus should be continued	100%	Mon 5/1/06	Mon 5/1/06	Mon 7/24/06	Fri 6/16/06
122	5.1.2.2	Lab Action #2 Benchmark practices for MCC bucket insertion/removal with other Laboratory Electrical Safety Standards	100%	Mon 5/22/06	Mon 6/5/06	Mon 7/24/06	Fri 6/16/06
123	5.1.2.3	Lab Action #3 Modify lab procedures and publish in SBMS and/or local procedures to include requirements for Live bus operations	100%	Tue 7/25/06	Fri 9/1/06	Tue 9/5/06	Fri 12/1/06
124	5.1.2.4	Lab Action #4 Train/Communicate Laboratory electrical workers in the updated procedures	100%	Wed 9/6/06	Fri 12/1/06	Thu 9/21/06	Fri 12/22/06
125	**5.1.3**	**DOE Team Interim Recommendation #6 -- Assure that Personal Protective Equipment Is Worn Properly**	**100%**	**Mon 5/1/06**	**Mon 5/1/06**	**Fri 11/10/06**	**Fri 9/29/06**
126	5.1.3.1	Lab Action #1 Review current practices for use of personal protective equipment	100%	Mon 5/1/06	Mon 5/1/06	Fri 11/10/06	Fri 6/30/06
127	5.1.3.2	Lab Action #2 Include the wearing of PPE wear as an item in upcoming negotiations with the IBEW	100%	Mon 6/12/06	Thu 7/6/06	Tue 6/13/06	Mon 7/10/06
128	5.1.3.3	Lab Action #3 Develop an assurance plan for the uniform Laboratory standard and practice on wearing of PPE	100%	Fri 11/10/06	Thu 7/6/06	Fri 11/10/06	Fri 9/29/06
129	**5.2**	**BNL Arc Flash Corrective Actions**	**67%**	**Mon 5/8/06**	**Mon 5/15/06**	**NA**	**Sun 9/30/07**
130	5.2.1	Human Performance -Based Accident Investigation	100%	Mon 5/8/06	Mon 5/15/06	Tue 5/23/06	Wed 5/31/06
131	5.2.2	Electrical Safety Assessment	60%	Thu 8/31/06	Wed 6/28/06	NA	Sun 9/30/07
132	5.2.3	Electrical Safety Effectiveness Review	100%	Mon 9/11/06	Wed 6/28/06	Tue 1/9/07	Fri 8/25/06
133	5.2.4	Lessons Learned Review	100%	Mon 5/29/06	Mon 8/28/06	Wed 1/10/07	Fri 9/1/06
134	**5.3**	**BNL Arc Flash Corrective Actions Approved by DOE [These actions are being tracked in ATS 3474]**	87%	Thu 8/31/06	Thu 8/31/06	NA	Tue 12/30/08
135	**6.0**	**Ongoing Action Plan Tracking/Follow-Up**	**88%**	**Wed 3/1/06**	**Mon 5/1/06**	**NA**	**Fri 12/28/07**
136	6.1	OSHA Assessment Action Plan	100%	Mon 5/1/06	Mon 5/1/06	Fri 5/12/06	Fri 7/28/06
137	6.2	Material Handling & Rigging Plan (ATS 1948)	100%	Mon 5/15/06	Mon 3/5/07	Fri 12/1/06	Fri 4/27/07
138	6.3	Industrial Hygiene Plan (ATS 2823)	100%	Wed 3/1/06	Wed 5/24/06	Wed 5/30/07	Wed 5/30/07
139	6.4	Electrical Safety Action Plan (ATS 2725)	95%	Mon 5/1/06	Mon 6/18/07	NA	Fri 12/28/07
140	6.5	Authority Having Jurisdiction (AHJ) Nationally Recognized Testing Laboratory (NTRL) Action Plan	50%	Mon 5/15/06	Mon 5/14/07	NA	Sun 9/30/07
141	6.6	Inadequate Control of Procedures (ATS 2935)	95%	Wed 3/1/06	Wed 7/12/06	NA	Sat 12/1/07
142	**7.0**	**Evaluation of ISM Recommendations & Improvement Initiatives**	**97%**	**Wed 3/1/06**	**Mon 5/1/06**	**NA**	**Fri 5/25/07**
143	**7.1**	**Evaluation of ISM Recommendations/Opportunities for Improvement**	**99%**	**Wed 3/1/06**	**Mon 5/1/06**	**NA**	**Tue 5/1/07**
144	**7.1.1**	**Radiological Protection Plan Revision**	**100%**	**Wed 3/1/06**	**Tue 8/1/06**	**Mon 9/18/06**	**Fri 9/29/06**
145	7.1.1.1	Revise the RPP scope statement to clarify the requirements of 10CFR835 for off-site radiological work	100%	Mon 5/15/06	Tue 8/1/06	Fri 9/15/06	Tue 9/19/06

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ID	WBS	Task Name	% Complete	Actual Start	Baseline Start	Actual Finish	Baseline Finish
146	7.1.1.2	Communicate RPP requirements to applicable Managers & Staff	100%	Wed 9/6/06	Wed 9/20/06	Mon 9/18/06	Fri 9/29/06
147	7.1.2	Radiological Awareness Report (RAR) Performance Expectations	100%	Wed 3/1/06	Tue 8/1/06	Fri 3/31/06	Thu 8/3/06
148	7.1.3	Waste Management Representative Support Services Evaluation	100%	Wed 3/1/06	Tue 8/1/06	Tue 4/25/06	Tue 9/26/06
149	7.1.4	Life Sciences Safety Culture/Performance Expectations	100%	Wed 3/1/06	Tue 8/1/06	Fri 3/31/06	Mon 8/14/06
150	**7.1.5**	**Conduct of Operations Evaluation and Implementation**	**100%**	**Wed 3/1/06**	**Mon 5/1/06**	**Fri 6/29/07**	**Fri 3/16/07**
151	7.1.5.1	Facilities & Operations Directorate perform an extent of condition review to determine if conduct of operation noncompliance exists across operational facilities	100%	Mon 5/1/06	Mon 5/1/06	Fri 1/19/07	Wed 7/12/06
152	7.1.5.2	Internal Audit and Oversight perform an effectiveness review of all corrective actions for the findings from the August 2003 IO Assessment	100%	Fri 12/1/06	Fri 12/1/06	Fri 6/29/07	Fri 3/16/07
153	7.1.5.3	Review/Update existing F&O Directorate Conduct of Operations Program	100%	Wed 3/1/06	Thu 7/13/06	Wed 9/20/06	Wed 8/23/06
154	7.1.5.4	Provide awareness training to applicable F&O staff on conduct of operations principles, program revisions, and management expectations	100%	Thu 8/24/06	Thu 8/24/06	Tue 10/17/06	Thu 9/21/06
155	**7.1.6**	**Nuclear Safety Authorization / Readiness**	**97%**	**Mon 4/3/06**	**Mon 7/3/06**	**NA**	**Sun 9/30/07**
156	7.1.6.1	Perform a verification of implementation and compliance with 10CFR830, Subpart B Nuclear Safety Management	100%	Mon 4/3/06	Mon 7/3/06	Fri 7/7/06	Thu 9/28/06
157	7.1.6.2	Perform an assessment of documented safety bases or pertinent exclusions/Exemptions	100%	Mon 8/14/06	Fri 9/29/06	Tue 10/31/06	Thu 11/9/06
158	7.1.6.3	Provide Unreviewed Safety Question determination training to managers and staff responsible for nuclear facilities	100%	Thu 7/6/06	Thu 7/6/06	Thu 7/6/06	Mon 7/10/06
159	7.1.6.4	Conduct an external assessment to independently verify Essential Safety System Functionality	100%	Mon 8/7/06	Fri 11/10/06	Fri 1/12/07	Wed 11/29/06
160	7.1.6.5	Update the Natural Phenomena Hazard (NPH) Design Document	100%	Mon 7/10/06	Mon 9/11/06	Fri 6/8/07	Wed 2/28/07
161	7.1.6.6	Follow up (7.1.6.2) and Corrective Actions to address greater than radiological-facility quantity of radionuclide vulnerabilities (Self-Assessment Report on Special Form Status)	65%	Thu 1/4/07	Mon 1/15/07	NA	Sun 9/30/07
162	7.1.6.7	Nuclear Safety Improvement Project Implementation	30%	Fri 7/6/07	Fri 7/6/07	NA	Sun 9/30/07
163	**7.1.7**	**Operating Experience / Lessons Learned Initiatives**	**100%**	**Mon 5/15/06**	**Tue 5/30/06**	**Fri 12/29/06**	**Fri 12/29/06**
164	7.1.7.1	Expand distribution of published lessons learned communications to include Level 1 and Level 2 managers, ES&H Coordinators, WCMs, and Safety & Health Services personnel	100%	Mon 5/15/06	Tue 5/30/06	Wed 5/31/06	Fri 6/16/06
165	7.1.7.2	Commence tracking & trending feedback received on each published Lessons Learned Communication	100%	Mon 6/19/06	Mon 6/26/06	Fri 8/18/06	Wed 8/9/06
166	7.1.7.3	Initiate a Bi-Annual Lessons Learned Coordinators workshop to prompt feedback, evaluate, and improve the BNL LL program	100%	Wed 11/1/06	Wed 12/6/06	Fri 12/29/06	Fri 12/29/06
167	**7.1.8**	**Construction Safety Subject Area review/Update**	**100%**	**Mon 3/27/06**	**Mon 6/12/06**	**Wed 2/28/07**	**Wed 2/28/07**
168	7.1.8.1	Perform a comprehensive review of the construction safety subject area, and incorporate improvements and new requirements	100%	Mon 3/27/06	Mon 6/12/06	Wed 2/28/07	Wed 2/28/07
169	**7.2**	**Worker Safety & Health Program Implementation**	**95%**	**Mon 5/1/06**	**Mon 5/1/06**	**NA**	**Fri 5/25/07**
170	**7.2.1**	**Worker Safety & Health Rule Implementation**	**95%**	**Mon 5/1/06**	**Mon 5/1/06**	**NA**	**Fri 5/25/07**

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ID	WBS	Task Name	% Complete	Actual Start	Baseline Start	Actual Finish	Baseline Finish
171	7.2.1.1	Develop a worker saefty and Health program description	100%	Mon 5/1/06	Mon 5/1/06	Fri 2/9/07	Fri 2/9/07
172	7.2.1.2	Subject Matter Experts to perform Gap Analyses on functional areas	100%	Mon 5/1/06	Mon 5/1/06	Fri 12/22/06	Mon 12/4/06
173	7.2.1.3	Develop and implement a corrective action plan that addresses gaps	70%	Fri 12/8/06	Mon 3/26/07	NA	Mon 4/30/07
174	7.2.1.4	Revise the PAAA investigations, inspections, and reporting processes	100%	Fri 12/1/06	Fri 12/22/06	Fri 3/9/07	Fri 5/25/07
175	7.2.1.5	Property and Procurement Management flowdown of worker, safety & health rule requirements to subcontractors	100%	Fri 12/29/06	Tue 12/5/06	Mon 4/30/07	Mon 4/30/07
176	**7.3**	**Safety Improvement Initiatives**	**96%**	**Fri 3/31/06**	**Wed 5/3/06**	**NA**	**Sun 12/30/07**
177	7.3.1	Excellence in ESS&H Strategic Focus Area	100%	Tue 5/9/06	Tue 5/9/06	Fri 11/17/06	Sat 9/30/06
178	7.3.2	Safety Observation Training for Managers and Supervisors	100%	Tue 5/9/06	Tue 5/9/06	Mon 10/23/06	Thu 11/2/06
179	7.3.3	OHSAS Registration Phase 3 Completion	100%	Fri 3/31/06	Wed 5/3/06	Fri 12/1/06	Fri 12/29/06
180	7.3.4	Employee Concerns Program Evaluation	100%	Thu 2/15/07	Wed 2/21/07	Wed 4/25/07	Wed 2/28/07
181	7.3.5	Executive Management Training Program	100%	Tue 8/1/06	Tue 8/1/06	Mon 12/4/06	Mon 1/1/07
182	7.3.6	Electronic Delivery of Experimental Safety Review Forms Evaluation	90%	Wed 2/28/07	Sun 4/1/07	NA	Tue 4/10/07
183	7.3.7	Effectiveness of Off-Site Integrated Safety Management	5%	Fri 6/29/07	Mon 1/1/07	NA	Sun 9/30/07
184	**7.3.8**	**Institutional Safety Committees Reporting Structure Review**	**98%**	**Fri 10/13/06**	**Mon 8/21/06**	**NA**	**Fri 10/27/06**
185	7.3.8.1	Perform an evaluation of the Institutional Safety Committees	100%	Fri 10/13/06	Fri 10/13/06	Fri 12/1/06	Mon 10/30/06
186	7.3.8.2	Re-Engineer the Safety Committee Reporting Structure	15%	Mon 1/14/08	Wed 11/1/06	NA	Sun 12/30/07
187	7.3.9	Feedback & Improvement, and WP&C Follow-Up Review	100%	Fri 9/15/06	Fri 9/1/06	Fri 10/13/06	Fri 10/27/06
188	**8.0**	**Project Management and Support**	**80%**	**Mon 5/1/06**	**Mon 5/15/06**	**NA**	**Tue 1/13/09**
189	8.1	Consulting Services & Subject Matter Experts	80%	Mon 5/1/06	Mon 10/2/06	NA	Wed 6/4/08
190	8.2	Administration and ISM Workshops	85%	Mon 5/1/06	Mon 5/15/06	NA	Mon 4/7/08
191	8.3	ISM/Safety Improvement Project Closeout	0%	NA	Wed 8/6/08	NA	Tue 1/13/09

VI.b Project Reviews/Performance Reporting

The ISM Project Manager will continuously evaluate the progress and performance towards meeting the ISM/Safety Improvement Project objectives and compare it to what was originally planned. The evaluation will enable the ISM/Safety Improvement Project Manager to:

- Improve project performance together with the management of this project.
- Reveal developing problems early so that action can be taken to mitigate risks and/or resolve issues and concerns.
- Reaffirm the Institutions commitment to this performance improvement project.
- Keep the Laboratory's senior management, stakeholders and clients informed of the project's status.

The ISM/Safety Improvement Project Manager will report schedule progress to the DDO and DOE-BHSO a monthly basis. At a minimum, the report shall contain:

1. Current project status (e.g. cost, schedule variance, percent complete).
2. Future status – forecast what is expected to happen, and if significant deviations are expected in schedule, cost and/or performance.
3. Status of high priority and/or critical activities status.
4. Risk Assessment – note whether any risk were identified that highlight the potential for project failure.
5. Status of changes
6. Lessons Learned – information that may be relevant to other projects

The ISM/Safety Improvement Project Manager determines the value of completed work. The basis of that determination is guided by seeking the most objective means possible, consistent with the nature of the work, to determine the percent complete of a specific task or activity. The ISM/Safety Improvement Project Manager assesses project performance against the baseline plan every month for all assigned project activities.

The responsible manager for each of the work breakdown elements serves as the starting point for the ISM/Safety Improvement Project Managers' determination of percent complete for the task or activity. Upon receipt and review of objective evidence (i.e. approved procedures, presentations, training material and rosters, published SBMS documents, etc), the Project Manager turns to other means of validating the work accomplished by the responsible manager or action owner. Several sources of additional information may be available. These include first-hand observations, meetings, telephone discussions with the responsible manager and/or action owner, and reports/documentation used as objective evidence. Upon assessment of all of these sources, activity/task % complete is determined for processing and reporting. To determine the subjective % complete, an educated guess must be employed.

VI.c Change Control Process

Change approval level and thresholds listed in Table 2 below establish the levels for any change to the ISM/Safety Improvement Plan baselines. Any project participant or stakeholder may propose a change. The ISM Project Manager reviews the request and identification of the affected system(s), confers with members of the Integrated Project Team (IPT), if needed, and makes the necessary changes, if appropriate. The ISM/Safety Improvement Project Manager routinely will communicate all changes to the IPT, who must approve any WBS Level 1 and above change. The IPT will include the DOE-BHSO, the BNL's Leadership and the BSA Board. The Project Manager and project participants must use the change control process to add, subtract, or modify the approved cost, schedule, and/or corrective actions.

Table 2, ISM/Safety Improvement Project Plan Change Approval Levels

	Integrated Project Team (Level 0 – 1)	Deputy Director for Operations (DDO)	ISM Project Manager (Level 3)
Cost	≥ $50K increase in FY 06 $420,000 FY 07 $550,000	Any increase in FY 06 $420,000 FY 07 $550,000	----------
Schedule	≥ 3 months delay in a level 1 schedule milestone	≥ 1 month delay in Level 1 or Level 2 schedule milestone	Any delay in a Level 3 activity/action item or ≤ 1 month delay in Level 2 schedule milestone
Corrective Actions	New scope or any modifications to corrective actions that address direct and/or root causes	Any change affecting the mission or scope of the ISM/Safety Improvement project plan	New/updates to corrective actions. Minor edits and clarification on corrective actions

VII Resource Requirements

Line Managers will ensure resources identified to support ISM project objectives are made available in the time frames that are specified for project deliverables. This requirement includes department/division participation in Laboratory-wide document and training development, review and revision of existing BNL processes and methodologies, and working with the ISM/Safety Improvement Project Manager to incorporate ISM requirements into management systems, program descriptions and/or subject areas, and communicating of those changes to appropriate BNL staff. Table 3 below shows the responsible managers, contributed resources and estimated level of effort needed for implementation of ISM/Safety Improvement Project Plan objectives.

Table 3, Contributed Resource Requirements and Level of Effort

WBS	Responsible Manager	Contributed Resource Requirements	Estimated Level of Effort[3]	Duration
1.0	P. Looney	Six Strategic Focus Area Champions Associate/Assistant Laboratory Directors T. Baker D. Ports E. Sierra J. Usher S. Alexander (Administration)	3hrs/wk/person	5/2006 to 11/2007 (130 weeks)
2.0	M. Bebon	C. Johnson B. Schwaner S. Coleman 2 Training Specialist 20 Work Control Managers Workers (Craft Workers) 20 Building Managers	2hrs/wk/person	5/2006 to 12/2006 (31 weeks)
3.0	R. Lebel	S. Coleman S. Stein J. Usher	1.5hrs/wk/person	5/2006 to 11/2007 (27 weeks)
		S. Scocca (FTE)	4,480 Hrs (full-time)	5/2006-8/2008
4.0	J. Tarpinian	C. Johnson S. Coleman R. Lebel	1hr/wk/person	5/2006 to 1/2007 (35 weeks)
5.0	A. McNerney	J. DiNicola Laboratory Electrical Safety Committee Electrical Engineers Electrical Craft Workers	25hrs/wk/person	5/2006 to 4/2007 (49 weeks)
6.0	P. Williams	M. Healy B. Schwaner M. Fallier R. Selvey J. Durnan S. Stein K. Orta	1.5hrs/wk/person	5/2006 to 12/2007 (83 weeks)
7.0	S. Coleman	K. Conkling R. McNair R. Costa D. Rocco G. Goode C. Schaefer W. Gunther J. Tarpinian K. Krasner P. Williams[4]	1 hr/wk/person 1000 Person-Hrs[3]	5/2006 to 2/2007 (40 weeks)
8.0	S. Coleman	B. Evelly (Administration) McCallum-Turner, Inc (External Support)	200 Hrs	5/2006 to 9/2007

[3] Estimated level of effort per person is indicated in parenthesis as hours per week.

[4] 10 CFR 851 Worker Safety & Health Rule level of effort and resource requirement.

Appendix A: Project Assessment Activities Schedule

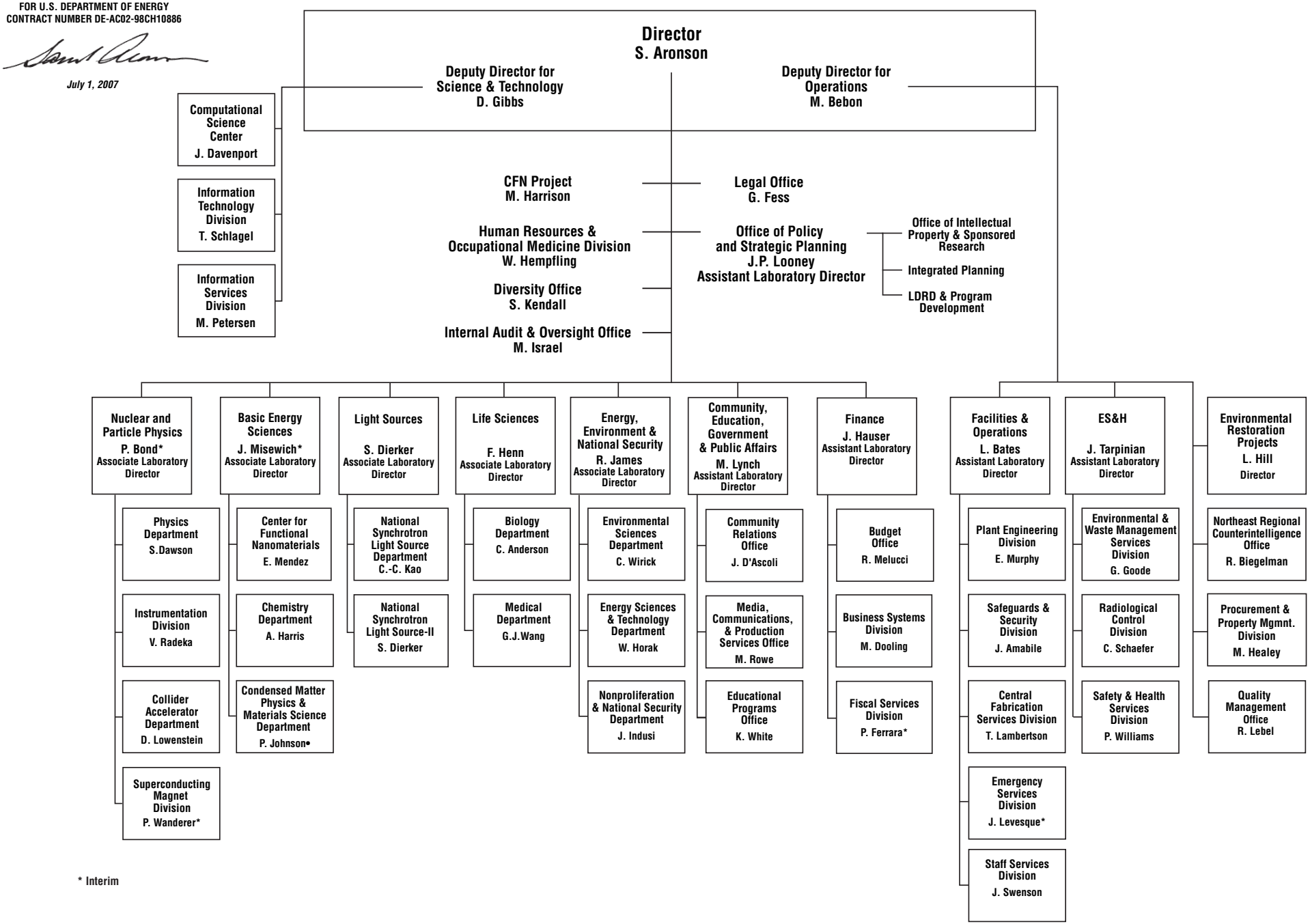
Assessment Activities	Target Completion Date	Status
Waste Management Support Services Evaluation	May 15, 2006	*Complete*
Human Performance-Based Accident Investigation	May 31, 2006	*Complete*
Review the NFPA 70E Standards and Determine the Adequacy of the Recommended Personal Protective Equipment	July 7, 2006	*Complete*
Comprehensive Gap Analysis Against Key Program Requirements	July 20, 2006	*Complete*
Evaluate the Building Manager Work Notification and Define the Building Manager Role in Work Planning and Control	July 12, 2006	*Complete*
Review Practices for Racking Circuit Breakers and MCC Buckets into Live Bus	July 24, 2006	*Complete*
Analysis of the Institutional Commitment to Independent Oversight	August 30, 2006	*Complete*
DOE's ORPS and Electrical Lessons Learned / Best Practices Review	September 1, 2006	*Complete*
Verification and Implementation with 10CFR830, Subpart B Nuclear Safety Management	September 28, 2006	*Complete*
Facilities and Operations Conduct of Operations Extent of Condition Review	September 30, 2006	*Complete*
Independent Electrical Safety Corrective Action Effectiveness Review	September 30, 2006	*Complete*
Institutional Safety Committees Reporting Structure Review	October 30, 2006	*Complete*
ISM Follow-up Review on Institutional Feedback & Improvement and Work Planning and Control	October 30, 2006	*Complete*
Documented Safety Bases/Exclusions/Exemptions	November 9, 2006	*Complete*
Internal Audit and Oversight Conduct of Operations Effectiveness Review of 2003 Corrective Actions	November 11, 2006	*Complete*
External Independent Assessment of Essential System Functionality	November 30, 2006	*Complete*
Worker Safety and Health Functional Area Gap Analyses	January 15, 2007	*Complete*
Employee Concerns Program Evaluation	March 31, 2007	*Complete*
Verify implementation of Lab-Wide and Internal Controlled Procedures Review Processes	April 1, 2007	*Complete*
Electrical Safety Self-Assessment	September 30, 2007	*In Progress*
Evaluate the Quality of Job Risk Assessments (JRAs)	September 30, 2007	---
Effectiveness Review of the Performance Management Program Re-Engineering Effort	November 30, 2007	---
Effectiveness Review of Lab-Wide and Internal Procedure Review Processes	December 1, 2007	---

Appendix B: BNL Organization Chart

BROOKHAVEN NATIONAL LABORATORY
Operated by
BROOKHAVEN SCIENCE ASSOCIATES
FOR U.S. DEPARTMENT OF ENERGY
CONTRACT NUMBER DE-AC02-98CH10886

July 1, 2007

BROOKHAVEN NATIONAL LABORATORY
Departments, Divisions and Offices



* Interim

Appendix C: BNL Site Map

MAP LEGEND

Buildings not listed here can be found in the Numerical List in the yellow pages section.

BUILDING NAME	Bldg. No.	Map Coord.
Administration	460	H6
AGS Exp. Area	912	I3
AGS Ring	913	H3
Alternating Gradient Synchrotron (AGS) Department	911	I4
Applied Sciences	179	H6
Atmospheric Chemistry Laboratory (DAS)	426	I6
Berkner Hall/ Cafeteria	488	G5
Biology	463	I7
Biosystems and Process Sciences Division	318	I6
BNL Science Museum	701	I4
BNL Video	493	H8
Booster (AGS)	942	G3
Brookhaven Center	30	F8
Brookhaven Linac Isotope Producer (BLIP)	931	G3
Calibration	348	E6
Carpentry/Signs	422	F6
Cavendish House (Men's Residence)	153	G7
Central Shops	462	H6
Chemical Sciences Division	815	J4
Chemistry	555	H5
Child Development Center (See Apartment Area Map)	373	—
Clinic/ Hospital	490	H7
Collider Center	1005S	I1
Compton House (Men's Residence)	170	F7
Computing & Communications	515	I5
Contracts & Procurement	355	I6
Credit Union	193	J6
Curie House (Women's Residence)	258	F7
Department of Advanced Technology	197	H4
DOE - BHG	454	I6
Energy Efficiency and Conservation Division	526	L5
Environmental Protection	535	J5
Environmental and Waste Technology Center	830	K4
Fire Department	599	F6
Fiscal	134	H6
Fleming House (Men's Residence)	180	G7
Graphic Arts	197	H4
Guest House	257	F7
High Flux Beam Reactor (HFBR)	750	J4
High-Field MRI	560	I5
Hot Laboratory (Medical)	801	I4
Housing/Transportation/Travel	179	H6
Human Resources	185	I6
Instrumentation Division (S&EP)	535	J5
Linear Accelerator - 200 MEV	930	F2
Management Information Systems	459	J5
Materials Science Division (DAS)	480	J5
Medical Research Center	490	H7
National Center for Analysis of Energy Systems	475	G7
National Nuclear Data Center (DAT)	197	H4
National Synchrotron Light Source	725	J5
Neutral Beam Test Facility	939	G3
Occupational Medicine	490	H7
Oceanography & Atmospheric Sciences Division	318	I6
Oceanography	194	I6
Office of Environmental Restoration	51	E6
PETT VI	906	I5
Photography	118	I6
Physics	510	I5
Plant Engineering	134	H6
Pool/Gymnasium	478	H6
Post Office	179	H6
Public Affairs	134	H6
Radiation Effect Facility	938	G3
Radiological Sciences Division	703	I4
Reactor Analysis DIV - DAT	475B	G7
Reactor Division	120	K5
Reactor Safety (DAT)	130, 820	H6, K4
Research Library	477	H6
Residences, Men's	153, 170, 180	G7, F7, G7
Residence, Women's	258	F7
RHIC Engineering	817	K3
RHIC Installation Complex	933	K2
RHIC Project Magnet Division	902	G5
Safeguards and Security Division/Police	50	G8
Safeguards, Safety & Non Proliferation	197	H4
Safety Division	129, 535	I5, J5
Science Education Center	438	G6
Service Station	630	I7
Shipping & Receiving	89	K7
Site Maintenance	326	F9
Supply and Materiel	211	K7
Tandem Van de Graaff/Cyclotron	901	I5
Telephone Switch Room	449	H6
Thermal and Fast Reactor Safety	130	H6
Tour and Museum Program Office	184	H6
Vehicle Repair	423	F9

2/97